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NC DENR

Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- **Prepare one form for each individually monitored unit.**
- **Please type or print legibly.**
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Altamont Environmental, Inc.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: Evan Yurkovich Phone: (828) 281-3350

E-mail: eyurkovich@altamontenvironmental.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Jackson County Municipal Solid Waste Landfill	US Highway 441 Dillsboro, NC 28725	50-02	.1600	February 21, 2011 and April 13, 2011

Environmental Status: (Check all that apply)

☐ Initial/Background Monitoring ☐ Detection Monitoring ☐ Assessment Monitoring ☒ Corrective Action

Type of data submitted: (Check all that apply)

- ☒ Groundwater monitoring data from monitoring wells
- ☐ Groundwater monitoring data from private water supply wells
- ☒ Leachate monitoring data
- ☐ Surface water monitoring data
- ☐ Methane gas monitoring data
- ☒ Corrective action data (specify) ____
- ☐ Other(specify) ____

Notification attached?

- ☐ No. No groundwater or surface water standards were exceeded.
- ☒ Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
- ☐ Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Christopher F. Gilbert, P.E.	Project Engineer	(828) 281-3350
Facility Representative Name (Print)	Title	(Area Code) Telephone Number

[signature] 06/30/2011

Signature Date

Affix NC Licensed/ Professional Geologist Seal

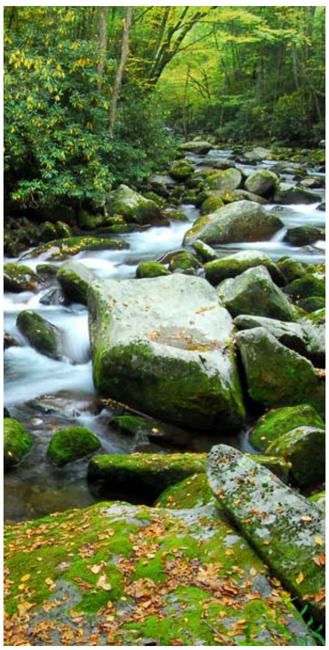
231 Haywood Street, Asheville, North Carolina 28801

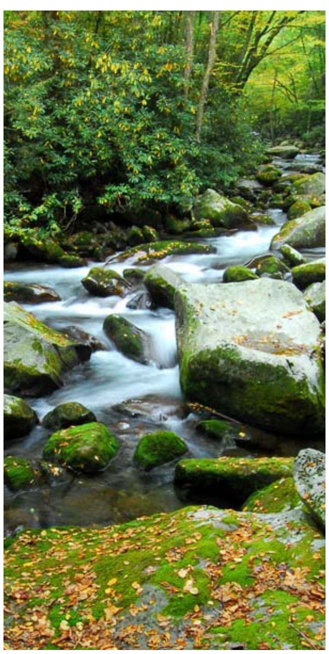
Facility Representative Address

C-2185

NC PE Firm License Number (if applicable effective May 1, 2009)

Revised 6/2009





ALTAMONT ENVIRONMENTAL, INC.

ENGINEERING & HYDROGEOLOGY

Corrective Action Plan

Jackson County
Municipal Solid Waste Landfill

Permit No. 50-02

June 30, 2011

Prepared for
Jackson County Solid Waste Department
Project Number 2040.3032

Prepared by
Altamont Environmental, Inc.
231 Haywood Street
Asheville, NC 28801
(828) 281-3350

Corrective Action Plan

Jackson County
Municipal Solid Waste Landfill

Permit No. 50-02

June 30, 2011

Evan Yurkovich

Christopher F. Gilbert, P.E.

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CERTIFICATION

I, Christopher F. Gilbert, a Professional Engineer for Altamont Environmental, Inc., do certify that the information contained in this report is correct and accurate to the best of my knowledge.

FIRM NUMBER - C-2185

NORTH CAROLINA PROFESSIONAL SEAL 030224 ENGINEER CHRISTOPHER F. GILBERT

06/30/11

Christopher F. Gilbert, P.E.

Executive Summary

The Jackson County Solid Waste Department maintains a closed Municipal Solid Waste Landfill (MSWLF) west of Dillsboro, North Carolina. This Corrective Action Plan (CAP) addresses that the groundwater underlying the landfill has historically been impacted with low concentrations of volatile organic compounds (VOCs). Altamont Environmental, Inc. (Altamont) prepared this document under contract to Jackson County. It has been prepared in accordance with a request for corrective action made by North Carolina Department of Environment and Natural Resources (DENR) Division of Waste Management (DWM) Solid Waste Section (SWS). This CAP generally follows the Solid Waste Section Corrective Action Guidelines.

Water quality monitoring at the landfill is governed by the DENR DWM SWS, under Permit No. 50-02 issued to Jackson County. The landfill permit requires semiannual monitoring of groundwater and surface water quality. Groundwater in this area flows in a southwesterly direction and most likely discharges into the Tuckaseegee River.

An Assessment of Corrective Measures (ACM) report was submitted to the DENR in response to the continued exceedances of analyzed constituents. Based on the report, the DENR requested that a remedy be provided to restore groundwater quality and effectively reduce contamination. A Corrective Action Permit Modification application was submitted and indicated that the selected remedy was leachate removal and monitoring natural attenuation parameters.

A compliance and review boundary was established for the closed landfill by referencing the North Carolina Administrative Code (NCAC), Title 15A, Subchapter 2L.0107. The objective of the selected remedy is to clean up the groundwater impacted by the closed landfill that exceeds the North Carolina 2L Standards outside of the compliance boundary.

Volatile organic compounds (VOCs) and metals have been historically detected in excess of the North Carolina groundwater quality standards. Individual metals are not persistently detected over time and, historically, elevated turbidity levels in the samples may have affected the results. Therefore, the objective of the approved remedy focuses on VOCs.

This CAP will be accomplished in a three-phase approach over a five-year time span. The CAP will utilize wells associated with a previously installed landfill gas extraction system. Dedicated pumps will be installed into each of the landfill gas extraction wells and leachate will be disposed of in the Tuckaseigee Water & Sewer Authority sewer system. After five years, the corrective actions discussed in this report will be evaluated and reviewed. If VOC concentrations are not reduced, contingency plans, which are presented in this report, may be considered.

1.0 Introduction

1.1 Site Background

The Jackson County Solid Waste Department maintains a closed Municipal Solid Waste Landfill (MSWLF) located approximately 0.8 miles west of Dillsboro, North Carolina, on the northeast side of Haywood Road (also referred to as Old Dillsboro Road and Old U.S. Highway 74; Figure 1). The water quality monitoring at the landfill is governed by the North Carolina Department of Environment and Natural Resources (DENR), Division of Waste Management (DWM), Solid Waste Section (SWS), under Permit No. 50-02 issued to Jackson County. The landfill permit requires semiannual monitoring of groundwater and surface water quality. Samples are collected from selected monitoring points during the spring and fall of each year.

The following bullets summarize key events in the landfill water quality monitoring program:

- Jackson County began implementing the assessment (Appendix II) groundwater semiannual sampling in 1998.
- Altamont began collecting the water monitoring samples and generating the semiannual reports in 1998.
- In 1999, MW-01 was installed in bedrock in the northeast-central part of the landfill just west of the ridgeline. This monitoring well was initially installed as a background well, but it exhibits groundwater impacted with volatile organic compounds (VOCs).
- In the late 1990s, Jackson County began sampling residential potable water supply wells on an annual basis from residents who consented to the sampling. One adjacent landowner has denied access and therefore no groundwater samples have been collected from his water well.
- In the late 1990s, Jackson County installed and began monitoring landfill gas (LFG) probes along the perimeter of the landfill property.
- The final acceptance of waste was received at the landfill in June 2001.
- Monitoring well MW-06 was installed into bedrock in 2004 to evaluate whether impacted groundwater could be migrating northward toward a water well located on an adjacent residential property.
- In winter 2005, Jackson County began the full-scale operation of nine LFG extraction wells screened within the landfill waste. To the extent that landfill gas can mobilize VOCs, it was thought that the removal of the gas may provide benefits to the groundwater quality.
- In July 2010, an additional bedrock monitoring well, MW-07, was installed clustered with the saprolite monitoring well MW-04 to evaluate groundwater quality in fractured bedrock southwest (downgradient) of the landfill.
- On September 7, 2010, the Assessment of Corrective Measures (ACM) report was submitted to the DENR in response to the continued exceedances of analyzed constituents.
- The DENR responded to the ACM report in a letter submitted to Jackson County on November 12, 2010 and requested that a remedy be provided to restore groundwater quality and effectively reduce contamination.
- A public meeting was held for comment on the ACM on February 7, 2011. There were no public comments regarding the assessment.

- A resolution selecting and approving a remedy was adopted by the Jackson County Board of Commissioners on May 2, 2011
- A North Carolina Solid Waste Groundwater Corrective Action Permit Modification application was submitted to the DENR on May 13, 2011, which indicated the selected remedy of leachate removal and monitoring natural attenuation parameters.
- The DENR responded to the permit modification application in a letter approving the selected remedy. Furthermore, the DENR letter requested the submittal of a Corrective Action Plan (CAP).

Currently, there are seven monitoring wells (four bedrock, one partially weathered rock, and two saprolite), nine LFG extraction wells, and 26 LFG probes at the Jackson County landfill. The locations of these features are shown on Figures 2 and 3. The well construction details for the groundwater monitoring wells are shown on Table 1.

The water quality is evaluated and reported on a semiannual basis and the LFG probes are evaluated and recorded on a quarterly basis.

1.2 Contaminant Distribution

As noted above, the groundwater underlying the landfill has historically been impacted with low concentrations of VOCs. The analytical data are presented in detail in semiannual water quality monitoring reports that Altamont, on behalf of Jackson County, has been submitting to DENR since 1999. Historic groundwater VOC analytical results are presented on Table 2. VOC concentrations both above and below associated North Carolina groundwater quality standards have been detected in MW-01 and MW-06 and the saprolite/partially weathered rock monitoring wells, MW-03, MW-04, and MW-05. Monitoring well MW-02, located in the northwestern part of the landfill property near the Tuckaseegee River (downslope of the waste), has historically shown some concentrations of VOCs, but no exceedances since 2002 of associated North Carolina groundwater quality standards. VOCs (1,1-dichloroethane [1,1-DCA], 1,4-dichlorobenzene [1,4-DCB], benzene, cis-1,2-dichloroethene [1,2-DCE], tetrachloroethene [PCE], trichloroethene [TCE], and vinyl chloride) have historically been detected more frequently and at higher concentrations than other analyzed VOCs. (Other compounds detected over the years include xylenes, methylene chloride, chlorobenzene, and chloroethane). Since the implementation of full-scale LFG extraction well operation in early 2005, a poorly developed downward trend in VOC concentrations is present for monitoring wells, MW-01, MW-03, MW-04, MW-05, and MW-06. However, as discussed below, exceedances of North Carolina groundwater quality standards continue to be detected in groundwater samples.

During the Spring 2011 semiannual water quality monitoring event, two VOCs (benzene and vinyl chloride) were detected in one or more monitoring wells at concentrations exceeding the associated water quality standards defined in North Carolina Administrative Code (NCAC), Title 15A, Subchapter 2L.0202 (the 2L Standards). Data from this sampling event is presented in the semiannual monitoring report submitted in June 2011 (Altamont 2011b). Bedrock monitoring well MW-01, located near the upgradient edge of the waste, exhibited an exceedance of one VOC, benzene, at 2.7 micrograms per liter (μg/L). Nearby residential water supply wells, also screened in bedrock, have exhibited no detections of VOCs. Saprolite monitoring well MW-05 also showed exceedances of two VOCs, vinyl chloride at 1.1 μg/L and benzene at 1.5 μg/L. This well is located near the downgradient edge of the waste. The two saprolite monitoring wells along the Tuckaseegee River, MW-02 and MW-04, showed no exceedances although some detections were identified in bedrock (bedrock well MW-07 contained an exceedance of benzene at 1.1 μg/L). Bedrock monitoring well MW-06 located in the northern portion of the landfill exhibited one compound, benzene, at a concentration of 1.8 μg/L, above its 2L Standard. Monitoring well MW-03, a saprolite well, did not show any VOC concentrations over the 2L Standard.

In accordance with historical results, the Spring 2011 surface water samples collected from the Tuckaseegee River showed no detections of VOCs.

Historically, isolated metals have been detected in the groundwater during semiannual monitoring events. Individual metals are not persistently detected over time and, historically, elevated turbidity levels in the samples may have affected the results. This CAP focuses on the VOCs. The selected remedy is designed to include potential metals in the groundwater. However, the selected remedy is not specifically designed to affect only metals.

1.3 Site Conceptual Model

The Jackson County landfill received construction and demolition (C&D) and municipal solid waste (MSW) up to 2002, and it is currently closed. The waste footprint has been completely capped with soil and the topsoil over the cap and is adequately vegetated. The waste material in the closed Jackson County landfill is interpreted to be the ultimate source of the underlying impacts to groundwater. The thickness of the waste is interpreted to vary and may range up to approximately 90 feet thick. The distance between the bottom of the waste and the groundwater is interpreted, based on limited data, to be roughly 40 feet. A synthetic liner and leachate collection system is not present between the bottom of waste and the groundwater. The contaminants are probably leached out of the waste and transported downward to the groundwater as a dissolved phase of the leachate.

Typically, groundwater flow directions in saprolite and partially weathered rock zones reflect local surface topography. Historic groundwater elevations are shown on Table 3. Monitoring wells MW-03, MW-04, and MW-05, located at the southern portion of the landfill (Figure 2), are completed in the saprolite or partially weathered bedrock. Groundwater in this area flows in a southwesterly direction and probably discharges into the Tuckaseegee River. Based on drilling records of MW-01 and MW-06, it is interpreted that very little to no groundwater is present in the saprolite in the northern part of the landfill.

Groundwater flow directions in the underlying bedrock are typically not as strongly influenced by surface topography as is groundwater flow in the saprolite and partially weathered rock zones. Groundwater flow patterns in bedrock fractures may be influenced by predominant fracture and joint orientations or locally induced hydraulic gradients caused by nearby pumping of domestic wells. Monitoring wells MW-01, MW-02, MW-06, and the newly installed monitoring well MW-07, are completed in the fractured bedrock. Groundwater flow within the fractured bedrock is in a general southwesterly direction at the landfill. It is probable that some of the groundwater in the shallower portions of the fractured bedrock discharges into the Tuckaseegee River. However, on the basis of limited data (three measuring events), the vertical gradient between the saprolite and bedrock at the southern corner of the landfill (MW-04 and MW-07) appears to be downward.

VOCs were detected in groundwater from monitoring wells in both the saprolite/partially weathered bedrock zone and the bedrock zone. As discussed above, the groundwater flow direction in the saprolite/partially weathered bedrock zone is predominately downslope toward the Tuckaseegee River to the southwest. VOCs detected in this water-bearing zone can be expected to migrate toward the river. Although there are low level detections of VOCs in this water-bearing zone, monitoring well MW-04, which is the downgradient well for this zone, does not consistently have VOC concentrations in excess of the 2L standards.

Along the northern boundary of the landfill, groundwater was not encountered in the saprolite/partially weathered bedrock. Consequently, the first encountered groundwater is in the bedrock zone. Detections of VOCs above the 2L Standard in monitoring wells MW-01 and MW-06 indicate migration of VOC-impacted groundwater in the fractured bedrock. As previously discussed, groundwater flow directions in the bedrock zone are southwesterly.

1.4 Compliance and Review Boundary

A compliance and review boundary was established for the closed landfill by referencing the NCAC, Title 15A, Subchapter 2L.0107. Since the solid waste permit was updated after December 30, 1983, the compliance boundary is established at a location 250 feet from the edge of the waste or 50 feet within the property boundary, whichever is closer to the edge of the waste. The compliance boundary is shown on Figure 2. As can be seen on Figure 2, monitoring wells MW-02, MW-04, MW-06, and MW-07 reside outside of the compliance boundary and the remaining monitoring wells, MW-01, MW-03, and MW-05 are located within the compliance boundary.

2.0 Contaminant Characterization

2.1 Contaminants of Concern

As discussed in Section 1.2 and in more detail in Section 2.5, volatile organic compounds (VOCs) and metals have been historically detected in excess of the North Carolina groundwater quality standards, shown on Table 2. Historically, isolated metals have been detected in the groundwater during semiannual monitoring events. Individual metals are not persistently detected over time and, historically, elevated turbidity levels in the samples may have affected the results. Therefore, the objective of the approved remedy focuses on VOCs.

2.2 Potential Receptors

2.2.1 Water Supply Wells

Single-family lots are located on the north, east, and west sides of the landfill, shown on Figure 3. These residences are primarily served by single-family-use water supply wells. The wells are commonly installed in fractured bedrock. Jackson County collects annual groundwater samples from two residential wells northeast of the landfill. These wells have not exhibited any VOC detections. The owner of the property adjacent to the landfill to the north, has consistently denied permission for the County to sample their well. The County maintenance facility and Green Energy Park, located southeast of the landfill, receive their water from the City of Dillsboro.

2.2.2 Tuckaseegee River

The Tuckaseegee River is located southwest of the closed landfill. Upgradient and downgradient surface water samples are collected from the river on a semiannual basis. Historically, no concentrations of VOCs have been detected in the surface water samples.

2.2.3 Other Receptors

Currently, the only potential human receptors at the site itself are workers and visitors to the landfill. The workers include operators of the LFG extraction system and personnel monitoring landfill gas migration and collecting groundwater samples to monitor the groundwater quality. Visits are infrequent and visitors are escorted by landfill operators.

2.3 Potential Exposure Pathways

Potential exposure pathways for the site include the following:

- Direct contact with waste or leachate—This exposure pathway is not complete because of controlled access to the landfill and the vegetated soil cap that covers the entire waste footprint.
- Human exposure to contaminated saprolite or partially weathered rock groundwater—This pathway may be complete if an individual uses water from the saprolite or partially weathered rock. However, most water wells in this area of Jackson County access the bedrock groundwater.
- Human exposure to contaminated bedrock groundwater—Nearby residents have water wells that access groundwater from the fractured bedrock. This exposure pathway is considered most viable, and the selected remedy focuses on reducing the risk of individuals exposed to this pathway.

- Human/ecological exposure to contaminated groundwater discharging into the surface water—This pathway is considered incomplete because surface water samples collected from the Tuckaseegee River do not exhibit detections of contaminants.

2.4 Background Concentrations

In 1999, monitoring well MW-01 was installed in bedrock in the northeast-central part of the landfill just west of the ridgeline. This monitoring well was initially installed as a background well, but it has exhibited groundwater impacted with VOCs.

Because MW-01 contains groundwater impacted with VOCs, the installation of a new background monitoring well may be evaluated during the implementation of the CAP.

2.5 Exceedances of Groundwater Quality Standards

During the Spring 2011 groundwater sampling event, VOCs decreased from the previous sampling events in Spring and Fall 2010 (except for MW-07, which was not installed until July 2010). Although the VOC concentrations are decreasing they continue to exceed the 2L Standard. The most recent results and historic analytical results are shown on Table 2.

The selected remedy focuses on reducing the concentrations of VOCs in groundwater outside of the compliance boundary described in Section 1.4 and shown on Figure 2. Monitoring wells MW-02, MW-04, MW-06, and MW-07 reside outside of the compliance boundary. These wells will be used to monitor the progress toward attaining the clean-up goals (the 2L Standards). The other monitoring wells, MW-01, MW-03, and MW-05 are located within the established compliance boundary and the groundwater within these wells will be monitored, but will not be used to determine attainment of the clean-up goals.

2.5.1 VOC Detections Within Compliance Boundary

During the most recent groundwater monitoring event, two VOCs (benzene and vinyl chloride) were detected at concentrations above their 2L Standards in groundwater samples collected from the monitoring wells located within the compliance boundary.

Concentrations of benzene were detected in two groundwater samples at concentrations (MW-01 at 2.7 μg/L and MW-05 at 1.5 μg/L), which exceed the compound's 2L Standard of 1 μg/L. Monitoring well sample MW-03 contained a detection of benzene (0.43J μg/L), which is below the respective 2L Standard. (Note: J-flagged results indicate estimated values).

Vinyl chloride was detected at a concentration exceeding its 2L Standard (0.03 μg/L) in the groundwater sample collected from MW-05 at 1.1 μg/L.

Concentrations of cis-1,2-dichloroethene were detected in the three samples collected from within the compliance boundary (MW-01 at 7.7 μg/L, MW-03 at 0.70J μg/L, and MW-05 at 17.8 μg/L), but concentrations were below the 2L Standard of 70 μg/L. Concentrations of 1,1-dichloroethane and trichloroethene were detected in MW-01 but were below the respective 2L Standards.

2.5.2 VOC Detections Outside of Compliance Boundary

Benzene was detected in two groundwater samples, MW-06 at a concentration of 1.8 μg/L and MW-07 at a concentration of 1.1 μg/L, which exceed the compound's 2L Standard of 1 μg/L. Benzene was also detected in monitoring well MW-04 (0.59J μg/L) but below the 2L Standard.

Concentrations of cis-1,2-dichloroethene were detected in all of the samples collected from outside of the compliance boundary (MW-02 at 0.50J µg/L, MW-04 at 3.9J µg/L, MW-06 at 5.4 µg/L, and MW-07 at 8.7 µg/L), but at concentrations below the 2L Standard of 70 µg/L.

Concentrations of 1,1-dichloroethane were detected in the two bedrock well samples (MW-06 at 0.85J µg/L and MW-07 at 0.54J µg/L) located outside the compliance boundary, but below the 2L Standard of 6 µg/L.

Monitoring well MW-06 also contained a detection of 1,4-dichlorobenzene (4.6 µg/L), but was at a concentration below the 2L Standard of 6 µg/L.

2.6 Exceedances of Surface Water Quality Standards

There have not been any VOCs detected in the surface water samples collected from the Tuckaseegee River. Historical surface water samples from the river, which likely receives discharge from the saprolite groundwater bearing zone, have consistently shown no detections of these compounds, or any other VOCs. On the basis of these data, it appears that groundwater likely discharging from under the landfill into the Tuckaseegee River is not impacting its surface water quality with regard to the monitored constituents.

2.7 Source Control Measures

As part of a landfill gas mitigation plan, Jackson County monitors and extracts LFG from nine extraction wells on-site. Landfill gas extraction well construction details are shown on Table 4. Currently, Jackson County has been dewatering the LFG extraction wells individually on a routine basis in order to increase the ability of the collection system to remove landfill gas. By dewatering the extraction wells, more of the perforated well-screen is exposed. The additional, exposed well-screen allows more LFG to be extracted. By extracting more LFG from the landfill, LFG migration is controlled. Furthermore, as described in Section 1.2, since LFG extraction began in early 2005, a downward trend in VOC concentrations in groundwater has been observed.

3.0 Selected and Approved Remedy/Technical Approach

To address the identified groundwater contamination at the Jackson County landfill, the selected and approved remedy is leachate removal and monitoring of natural attenuation parameters. Leachate will be extracted from the existing landfill gas extraction wells and discharged into the Tuckaseigee Water and Sewer Authority's sanitary sewer collection system. This approved corrective action will be implemented over three years through three phases.

3.1 Corrective Action Objectives

In accordance with NCAC Title 15A, Subchapter 13B.1636, the corrective action objectives of the selected remedy are as follows:

- Be protective of human health and environment
- Attain the approved groundwater protection standards (2L Standards) outside of the landfill compliance boundary
- Control the source of release so as to reduce or eliminate, to the maximum extent practical, further releases of contaminants of concern into the environment that may pose a threat to human health or the environment
- Comply with applicable state and federal standards for the management of solid waste

3.2 Objective of Approved Remedy

A compliance boundary is established as indicated on Figure 2. The objective of the selected remedy is to clean up the groundwater impacted by the closed landfill that exceeds the North Carolina 2L Standards outside of the compliance boundary. Monitoring wells MW-02, MW-04, MW-06, and MW-07 reside outside of the compliance boundary and therefore the groundwater within these wells will be monitored to gauge the progress towards reaching the 2L Standards. The other monitoring wells, MW-01, MW-03, and MW-05, are located within the established compliance boundary, and the groundwater within these wells will be monitored, but will not necessarily be used to determine attainment of the objectives of the selected remedy.

Based on the most recent groundwater sampling event conducted in April 2011, the primary contaminant of concern is benzene, which was detected above its 2L Standard outside of the compliance boundary in samples collected from monitoring wells MW-06 and MW-07. The samples collected in April 2011 from the monitoring wells located outside of the compliance boundary also contained detections of chlorinated volatile organic compounds but below their respective 2L Standards.

Historically, several volatile organic compounds have been detected in samples collected from monitoring wells located outside the compliance boundary. Historical detections of VOCs outside of the compliance boundary are included in Table 2 and as follows:

- MW-02—1,1-dichloroethane, 1,4-dichlorobenzene, benzene, cis-1,2-dichloroethene, trichloroethene, and vinyl chloride
- MW-04—1,1-dichloroethane, 1,4-dichlorobenzene, benzene, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride
- MW-06—1,1-dichloroethane, 1,4-dichlorobenzene, benzene, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride

- MW-07—1,1-dichloroethane, 1,4-dichlorobenzene, benzene, cis-1,2-dichloroethene, and trichloroethene

Since the first semiannual sampling event in 2010, the following VOCs have been detected in excess of the 2L standard outside of the compliance boundary:

- Benzene
- 1,4-dichlorobenzene

The April 2011 sample analytical results for these two contaminants of concern are posted on Figure 2.

Isolated metals have been detected in the groundwater during semiannual monitoring events. Individual metals are not persistently detected over time and, historically, elevated turbidity levels in the samples may have affected the results. The objective of the selected remedy focuses on VOCs.

3.3 Leachate Extraction from Landfill Gas Extraction Wells

3.3.1 Field Investigations

Jackson County has been dewatering the LFG extraction wells on a routine basis in order to increase the ability of the collection system to remove landfill gas. On February 21, 2011, Altamont and Jackson County gauged and dewatered landfill gas extraction wells EW-04, EW-05, and EW-09 in order to determine the potential effectiveness of installing permanent pumps in each well to extract leachate and increase the LFG recovery within the unlined landfill. Prior to performing the tests, the extraction wells contained 10 to 20 feet of leachate in each of the extraction wells when gauged. A two-hour dewatering event was conducted on each of the three extraction wells resulting in approximate individual yields of about 3.5 gallons per minute (gpm). Based on this investigation, it is expected that the full-scale implementation of leachate extraction from the nine LFG extraction wells would result in the removal of around 1.2 million gallons of water annually.

3.3.2 Leachate Quality

Representative water samples were collected from extraction wells EW-04 and EW-09 discharge lines on February 21, 2011.

The samples were analyzed for Appendix I volatile organic compounds (VOCs) using US Environmental Protection Agency (EPA) Method 8260 and Appendix I metals using EPA Method 6010. VOC concentrations were detected exceeding their respective 2L Standards, as shown on Table 5. The analytical report is included as Appendix A.

Most of the VOCs detected in the samples collected from EW-04 and EW-09 have historically been detected in the groundwater. According to the April 2011 semiannual groundwater sampling results, benzene, which was detected in the samples collected from EW-04 and EW-09 was detected in excess of the 2L Standard in monitoring well samples collected from outside the compliance boundary.

1,4-dichlorobenzene was detected in the samples collected from EW-04 and EW-09 in excess of the 2L standard. 1,4-dichlorobenzene was detected in excess of the 2L Standard in monitoring well sample MW-06 (outside the compliance boundary) in October 2010. 1,4-dichlorobenzene was not detected in excess of the 2L Standard in monitoring well samples collected from outside the compliance boundary in April 2011.

Cis-1,2-dichloroethene was detected in both the leachate samples and all seven of the monitoring well samples during the most recent sampling event. However, based upon Tables 2 and 5, cis-1,2-dichloroethene has not been detected in excess of the 2L Standard in groundwater or leachate samples collected at the closed Jackson County landfill.

3.3.3 Model of Water Infiltrating Through Landfill

3.3.3.1 HELP Model

The Hydraulic Evaluation of Landfill Performance (HELP) model was referenced in order to determine the amount of water infiltrating through the landfill. The assumptions underlying the model are described within the software documentation (Schroeder, et. al. 1994). To run the model, several inputs must be provided. The inputs that were used in the HELP model in order to simulate the amount of water infiltrating into the closed Jackson County landfill can be described as follows:

- Precipitation, temperature, solar radiation, and evapotranspiration—The default normal/mean values for the Asheville region were used.
- Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service (SCS), runoff curve number—A runoff curve number of 74 was used based upon the information contained in Appendix B. (Note: the curve number was modified by the model to account for landfill surface slope and slope length).
- Projected surface area of the soil cap above the waste—7.3 acres was used.
- Topsoil layer—A six-inch vertical percolation layer consisting of sandy clayey loam was used (defined as SCL by the United States Department of Agriculture).
- Landfill cap layer—An 18-inch vertical percolation layer consisting of sandy clayey loam (defined as SCL by the United States Department of Agriculture) was used.
- Waste layers—A ten-foot, and four 20-foot vertical percolation layers consisting of the default values for solid waste were used.
- Bottom liner layer—A four-foot barrier soil liner layer consisting of sandy loam was used (defined as SL by the United States Department of Agriculture).

Using these inputs and the HELP modeling software, an output file was created based upon a 100-year simulation period. The output file is included as Appendix C.

3.3.3.2 Estimated Volume of Water Infiltrating Through Landfill

Based upon the HELP model output, it is estimated that approximately 19 inches per year of rainfall infiltrates into the waste at the closed Jackson County landfill (see average annual totals on page 58 of Appendix C). Based upon this infiltration rate and the projected surface area of the soil cap above the waste (7.3 acres), the estimated volume of water infiltrating through the landfill was calculated. The calculation is summarized on Table 6. To verify the results of the HELP model, the document titled *Ground-Water Recharge in North Carolina* was referenced (Heath 1994). According to this document, the estimated groundwater recharge rate in the geographical area that includes the closed Jackson County landfill is 600,000 gallons per day per square mile. Based upon this groundwater recharge rate and the projected surface area of the soil cap above the waste, a second estimate of the volume of water infiltrating through the landfill was calculated. The calculation is summarized on Table 6. This calculation was averaged with the HELP model calculation to arrive at an estimated volume of water infiltrating through the landfill of 3.132 million gallons per year.

3.3.3.3 Estimated Volume of Water to be Extracted

As described in Section 3.3.1, based upon the dewatering event conducted on February 21, 2011, the estimated volume of water to be extracted from the LFG extraction wells is approximately 1.2 million gallons per year following full implementation of approved remedy (see phases described in Sections 3.5.1, 3.5.2, and 3.5.3).

3.3.3.4 Estimated Mass of Contaminants to be Removed

Focusing on the contaminants of concern, benzene and 1,4-dichlorobenzene, detected in water samples collected from EW-04 and EW-09 on February 21, 2011, the mass of contaminants that will be removed by extracting leachate from the LFG extraction wells during the first five years of full implementation is approximately 0.55 pounds (Table 7).

The following assumptions are made concerning the water that will be extracted from the landfill:

- The source of the extracted water is primarily water infiltrating through the landfill cap into waste.
- Most, if not all, of the estimated volume of water infiltrating through the landfilled waste becomes leachate.
- The quality of leachate generated by the landfill is relatively uniform.
- The samples collected from EW-04 and EW-09 on February 21, 2011 are representative of the quality of the water to be extracted.

Based upon these assumptions, on a percent-removal basis, the mass of contaminants of concern in the water that will be removed by extracting leachate from the LFG extraction wells versus the mass of contaminants of concern being leached from the waste through infiltration is approximately 38%.

3.4 Monitoring of Natural Attenuation

3.4.1 Contamination to be Addressed by Natural Attenuation

As stated in the previous section, 38% of the mass of contaminants of concern in the water being leached from the waste through infiltration should be addressed through leachate extraction from the LFG extraction wells. As a result, 62% of the mass of contaminants of concern in the water infiltrating through the landfill may not be removed before reaching the groundwater table. The remaining mass of contaminants of concern reaching the groundwater table will be addressed through natural attenuation processes. The physical, chemical, and biological natural attenuation processes that help to reduce the mass of contaminants of concern will likely include the following:

- Biodegradation
- Dispersion
- Dilution
- Sorption
- Volatilization
- Chemical or biological stabilization, transformation, or destruction

The selected remedy includes additional parameters to be monitored during the routine groundwater monitoring sample collection events, to help gauge the impact of these processes on the mass of contaminants of concern remaining following leachate extraction (discussed in Section 3.5.3). Additionally, the selected remedy includes the establishment of compliance wells, performance wells, and sentinel wells and an EPA-approved monitored natural attenuation screening model (discussed in the following sections).

3.4.2 Compliance, Sentinel, and Performance Wells

A compliance boundary has been established as indicated on Figure 2. As stated in Section 3.2, the objective of the selected remedy is to clean up the groundwater outside of the compliance boundary that was impacted by the closed landfill and exceeds the North Carolina 2L Standards. Monitoring wells MW-02, MW-04, MW-06, and MW-07 reside outside of the compliance boundary; and therefore, the groundwater within these wells will be monitored to gauge the progress towards reaching the 2L Standards. These wells are the compliance wells.

Sentinel wells are used to monitor the plume movement toward adjacent properties and receptors. Typically, sentinel wells are not impacted with detectable concentrations of constituents. However, due to space constraints between the landfill, the Tuckaseegee River, and the adjacent properties, the establishment of sentinel monitoring wells may not be practical. Identifying new monitoring well locations for the establishment of sentinel monitoring wells may be considered during the implementation of the CAP.

The remaining monitoring wells, MW-01, MW-03, and MW-05, are located within the established compliance boundary. The groundwater within these wells will be monitored to track remediation performance, but will not necessarily be used to determine attainment of the objectives of the selected remedy. Two of these monitoring wells, MW-03 and MW-05, are located downgradient of the landfill but upgradient of the compliance monitoring wells. These wells are the performance wells.

3.4.3 Monitored Natural Attenuation Screening Model

As stated in Section 3.2, based on the most recent groundwater sampling event conducted in April 2011, the primary contaminant of concern is benzene. Benzene was detected above its 2L Standard in samples collected from monitoring wells MW-01, MW-05, MW-06, and MW-07.

Benzene is amenable to natural attenuation. The natural attenuation processes can be modeled given suitable information regarding the mechanisms that drive the natural attenuation processes. As long as benzene and other VOC concentrations remain below the 2L Standard in groundwater samples collected from MW-03, the selected remedy will be considered to be performing adequately within the partially weathered bedrock within the area surrounding this well.

Because benzene is a contaminant of concern, and because benzene was detected in samples collected from MW-05 in excess of the 2L Standards, a Performance Target Level should be established for samples collected from this well. The Performance Target Level is a concentration that, if achieved, should result in concentrations at or below the 2L Standard at the compliance boundary.

To calculate the Performance Target Level for benzene in groundwater based on the locations of the edge of waste and compliance boundary and the approximate migration pathway between MW-05 and MW-04, the BIOSCREEN model is utilized (Newell, et. al. 1996). The BIOSCREEN model depicts the current plume delineation and predicts the future plume attenuation/migration. BIOSCREEN is based on the Domenico analytical solute transport model and simulates advection, dispersion, adsorption, and aerobic and anaerobic biodegradation.

BIOSCREEN provides three different kinetic models for analysis. A “no decay” model is presented for non-degrading solutes for conservative comparative analysis. A first-order decay model combines all parameters (dispersion, adsorption, biodegradation, and advection) into a single coefficient that is calibrated to site-specific data. An “instantaneous decay” model is based upon the assimilative capacity of microorganisms derived from the stoichiometric relationships between the solutes and available electron acceptors. The decay is assumed to be instantaneous, as rates of microbial biodegradation are orders of magnitude less than other limiting kinetic rates such as those for advection, diffusion and desorption. While available electron acceptors such as oxygen, nitrates, and sulfates are often not completely consumed, data collected by the model developers from multiple United States Air Force remediation projects suggest that the instantaneous decay model more accurately predicts field data than first-order decay models. However, the model's predictions are limited as BIOSCREEN assumes simple groundwater flow and can only approximate complicated processes that occur in the field. Furthermore, some of the underlying assumptions within the model may not conform to this site because the contaminants are emanating from a landfill and not a petroleum release (i.e., the BIOSCREEN model was developed for simulating remediation through natural attenuation at petroleum fuel release sites).

The Performance Target Level is the concentration that must be achieved in order to be at or below the 2L Standard at the compliance boundary. Prior to the Performance Target Level calculation, the model must be calibrated to current site conditions. To calibrate the model certain information (input parameters) must be known. The input parameters needed to run the BIOSCREEN model are described in the model user's manual (Newell, et. al. 1996). For the closed MSW landfill some of this information is known, while some of this information is assumed. Following the initial sample collection and natural attenuation parameter analysis event scheduled for October 2011, the model will be recalibrated with any new information. In the interim, a simulation was calculated using the BIOSCREEN first-order decay model based upon the following input parameters:

- Seepage Velocity—The seepage velocity was calculated by multiplying the hydraulic conductivity by the hydraulic gradient and dividing by the effective porosity. The hydraulic conductivity is assumed to be 0.0001 centimeters per second, the hydraulic gradient was calculated based upon the elevation difference between MW-05 and MW-04 (0.08893 feet per foot), and the effective porosity was assumed to be 0.25.
- Dispersivity—The longitudinal dispersivity was based upon the "Xu and Eckstein" formula, which is a logarithmic function of plume length. The transverse dispersivity was calculated to be 10 percent of the longitudinal dispersivity (as recommended in the BIOSCREEN user's manual). The vertical dispersivity was assumed to be negligible.
- Retardation Factor—The retardation factor was assumed to be a unitless value of 1.0 for dissolved contaminants moving through the aquifer at the seepage velocity.
- First-Order Decay Coefficient—The first-order decay coefficient was calculated based upon the solute half-life (the time for dissolved benzene concentrations to decay by one-half as contaminants move through the aquifer). The solute half-life was assumed to be one year.
- Instantaneous Reaction Model Parameters—These parameters represent typical values observed at the sites that were used develop the BIOSCREEN model (e.g., Air Force Center for Environmental Excellence sites). Observed values will be used in subsequent iterations of the model.
- Modeled Area Length and Width—The modeled area length, 450 feet, represents the distance between the MW-05 and the Tuckaseegee River. The modeled area width, 900 feet, represents the width of the waste perpendicular to the assumed direction of groundwater flow.
- Simulation Time—The simulation time is assumed to be the number of years from the time the landfill began operating until today, or 44 years.
- Source Area Thickness in the Saturated Zone—The source area thickness in the saturated zone is assumed to be the estimated distance between the bottom of waste and the top of bedrock, or approximately 20 feet.
- Source Zone Width—The source width was assumed to be one-fifth of the modeled area width, or 180 feet.
- Soluble Mass—Altamont made actual estimates of the soluble mass of benzene based upon the volume of waste in place and benzene concentrations in samples collected from EW-04 and EW-09. These estimates resulted in a value of between 50 and 65 kilograms of soluble mass. However, the

estimates under-predicted the concentration of benzene in downgradient wells. Therefore, Altamont assumed the soluble mass to be a constant source or "infinite."

A Performance Target Level was calculated for benzene in MW-05. A Performance Target Level was not calculated for 1,4-dichlorobenzene in MW-05 because it was not detected in excess of the 2L Standard in samples collected from MW-04 and MW-05 during the most recent sample collection event (spring 2011). The Performance Target Level is achieved through running multiple model iterations and adjusting the benzene concentration in MW-05 such that the migration of this constituent resulted in a compliance boundary concentration at the 2L Standard based upon the first-order decay model. The compliance boundary is located approximately 220 feet downgradient from MW-05 in the assumed groundwater flow direction to the southwest. The Performance Target Level for benzene in MW-05 is 20 µg/L. The model output spreadsheets are presented in Appendix D.

3.5 Approach, Design, and Specifications of Approved Remedy

The approved corrective action of leachate removal and monitoring of natural attenuation was approved by the DENR on June 2, 2011. The removal of leachate from the unlined, closed landfill will reduce VOC impacts on the groundwater and assist in increasing landfill gas collection.

The approved remedy will be implemented through three phases, described in the following sections.

3.5.1 Phase I

The first phase of the approved corrective action will occur beginning in the fall of 2011.

3.5.1.1 Sampling and Analysis Plan

Semiannual groundwater monitoring will be conducted for the monitoring wells and surface water sampling locations. In order to evaluate the effectiveness of monitored natural attenuation (MNA), baseline trends will be established. The groundwater monitoring wells inside and outside of the established compliance boundary will be sampled and evaluated. The MNA baseline sampling will be conducted during four semiannual sampling events. After the fourth sampling event, the MNA parameters will be evaluated to determine if the frequency of sampling may decrease or cease for certain parameters based on their technical relevance.

In addition to the regular sampling analyses, the following parameters will be included in order to monitor natural attenuation:

- Alkalinity, biological oxygen demand (BOD), carbon dioxide, chemical oxygen demand (COD), chloride, ethene, ethane, ferrous iron, hydrogen, methane, nitrate, sulfate, sulfide, total organic carbon (TOC), and volatile fatty acid

The following field parameters will also be collected and evaluated:

- Dissolved oxygen, oxygen reduction potential (ORP), pH, temperature, conductivity, and turbidity

3.5.1.2 Plans, Permits, and Bid Documents

As part of the initial steps of implementing the CAP, the following documents will be completed and submitted:

- Future sampling and analysis plan
- Health and safety plan
- Bid documents

3.5.1.3 Connection to Tuckaseigee Water and Sewer Authority

Altamont has obtained approval from the Tuckaseigee Water & Sewer Authority (TWSA) to connect and discharge the landfill leachate into their system. According to the May 16, 2011 TWSA letter to Altamont, a few stipulations need to be met in order for the TWSA to accept the discharge, as follows:

- A magnetic flow meter will need to be installed in-line to the TWSA system. Additionally, an independent instrumentation firm will need to certify calibration of the meter annually.
- At no cost to TWSA, TWSA will be permitted to conduct sampling of the discharge as they deem necessary.

3.5.1.4 Wet Well Installation

As part of the Phase I, a wet well or lift station will be installed near the old scale foundation and current LFG extraction system (Figure 4). The wet well will be 2,000-gallons in capacity and capable of holding and conveying leachate from all of the extraction wells when pumping at the end of Phase III. A suction centrifugal lift pump will be installed adjacent to the wet well in a protective subgrade vault and controlled by high, middle, and low-level floats, capable of shutting down the system if the leachate level gets too high or too low. An aboveground control panel will be installed next to the wet well and will operate the lift pump and associated level shut-off floats. The wet well details are shown on Figure 4.

3.5.1.5 Force Main Installation

In order to connect the leachate extraction system to the TWSA, a trench will be installed from the wet well to the existing manhole located south of the Green Energy Park, as shown on Figure 3. Approximately 650 feet of three-inch-diameter standard-dimension-ratio-(SDR)-11 high density polyethylene (HDPE) piping will be used to connect the leachate extraction system to the TWSA. A flow meter will be installed after the wet well and prior to discharging into the TWSA. The flow meter will be contained in a protective subgrade vault.

3.5.1.6 Leachate Extraction

Currently, Jackson County is pumping leachate individually, as needed, from the LFG extraction wells and storing the leachate in a storage tank near the old scale foundation. The wells will continue to be dewatered individually but the leachate will be pumped to the wet well instead of the storage tank and disposed of into the TWSA system through the force main piping.

3.5.2 Phase II

3.5.2.1 Leachate Extraction System Installation

As part of the second phase that will occur during the second year of the CAP implementation, dedicated pneumatic pumps will be installed into each of the nine existing LFG extraction wells. Extraction wells range in depths between 40-feet below ground surface and 90 ft-bgs, construction details are shown on Table 4.

Altamont recommends installing QED Environmental Systems (QED) bottom inlet air powered pumps at the bottom of each extraction well, as follows:

- Three-inch diameter QED AP3B model pumps for the four-inch diameter extraction wells EW-1 through EW-3
- Four-inch diameter QED AP4+B model pumps for the six-inch diameter extraction wells EW-04 through EW-09

Currently Jackson County owns and operates an AP4 top inlet pump to extract leachate from the extraction wells. This pump will be converted from a top inlet pump to the QED AP4+B bottom inlet model and dedicated to one of the extraction wells. Additionally, modifications will be conducted on the extraction well heads in order to incorporate the landfill gas and leachate dual extraction lines.

3.5.2.2 Air Compressor

In order to operate the dedicated pneumatic pumps, an air compressor will be installed in the area adjacent to the leachate wet well. The air compressor will be used to pump the leachate from the extraction wells during Phases II and III.

Approximately three cubic feet per minute (cfm) of air will be injected into each leachate extraction pump at an estimated 80 pounds per square inch gauge (psig) for the AP3 pumps and 120 psig for the AP4 pumps. This results in the need for an approximately 10 horsepower (Hp) compressor with a 120 gallon receiver tank for the system assuming the pumps will operate for two hours on and two hours off, following full implementation of the selected remedy.

The air compressor will be a direct-coupled, continuous-duty, air-cooled, rotary-screw compressor. The air compressor will be equipped with sound attenuation to 75 decibels (dBA).

To ensure that clean, oil-free air is delivered to the pumps, three-stage particulate, oil-coalescing, and activated carbon filters may be placed on the discharge of the receiver tank.

3.5.3 Phase III

The last phase of the corrective action implementation is to install air and leachate lines from the wet well and air compressor to all of the LFG extraction wells. A trench approximately two feet wide will be installed from the wellheads to the old scale foundation area where the wet well and air compressor will be located, as indicated on Figure 3. The trench will be installed such that waste is not exposed during installation. Approximately 1,500 feet of two-inch diameter SDR 9 HDPE air line conveying compressed air to the wells and 1,500 feet of three-inch diameter SDR 11 HDPE discharge line conveying leachate from the wells to the wet well will be installed in the trench (see detail on Figure 5). Both lines will be reduced to one-inch diameter piping at the wellhead.

The wellheads at the nine existing landfill gas extraction wells will be constructed to allow the removal of both leachate and landfill gas from each extraction well. Figure 5 depicts the construction of the proposed extraction wellhead. A two-inch diameter compressed air line will connect to one-inch diameter piping into the well casing and the pneumatic pumps located within the wells. A one-inch diameter discharge hose will connect to the QED AP3B and QED AP4+B model pumps, which will convey leachate from the wells to the three-inch diameter SDR 11 HDPE leachate collection trunk line within the trench. Landfill gas will continue to be collected from the extraction wells using LANDTEC ACCU-FLO Wellheads. The LANDTEC ACCU-FLO Wellheads will be mounted within the well casing. The LANDTEC ACCU-FLO has a temperature port, hose barb for gas sampling, and is connected to two-inch flexible hose. The two-inch flexible hose will be disconnected during construction and installation of the submersible pumps and reconnected to the four-inch lateral LFG collection pipe connected to the LFG extraction system at the completion of construction.

A process flow diagram flowing full implementation is included as Figure 6.

4.0 Evaluation of Effectiveness and Report Submittals

On a semiannual basis, effective after the implementation of the corrective action measures, the following items will be evaluated to ensure that progress is being made toward remediation goals:

1. Physical Changes in Aquifer Conditions

   Groundwater elevations will be evaluated to identify any changes in flow direction or hydraulic gradients at the site. If significant changes are detected in the hydraulics of the aquifer, the site conceptual model will be re-evaluated to assess any potential impacts with respect to exposure pathways and receptors.

2. Chemical Changes in Aquifer Conditions

   Field parameters will be evaluated to understand the subsurface chemical conditions that indicate a change in aquifer conditions. If the pH, dissolved oxygen concentrations, or other field parameters change significantly over time, this may suggest potential future changes in plume behavior. The dissolved oxygen concentrations will be used to evaluate whether the site is under aerobic or anaerobic conditions.

3. Physical Changes in Plume Characteristics

   The existing monitoring well network includes downgradient monitoring wells (both saprolite and bedrock wells) outside of the compliance boundary. If a sustained increase in concentrations of contaminants is detected in the compliance wells, then appropriate actions will be implemented to manage the risk associated with the detected expansion of the plume.

4. Chemical Changes in Plume Characteristics

   Analytical results will be evaluated for evidence of changes in the size or concentration of the plume, as well as in the types of contaminants detected.

Following full scale implementation of the approved remedy, extraction system inspections and maintenance will occur on a monthly basis in order to optimize the system operation. In addition, a compliance sample will be collected from the extraction wells during the semiannual groundwater monitoring events. Samples will be analyzed as described in the previous section. The results will be summarized in the semiannual groundwater monitoring reports for the sampling conducted in Spring and Fall of each year. The results will be used to estimate the mass of contaminants of concern removed by the extraction of leachate from the LFG extraction wells.

5.0 Contingency Plan

Two contingency plans have been established if the leachate extraction and natural attenuation remedy does not reduce the groundwater volatile organic compound concentrations after the five years beyond the compliance boundary.

5.1 Plan A: In Situ Treatment

As discussed in Section 3.2 and based on the most recent sampling results, benzene and 1,4-dichlorobenzene remain the contaminants of concern. Benzene and 1-4-dichlorobenzene can be degraded under aerobic conditions. Aerobic conditions could be enhanced by injecting a solution (magnesium peroxide or calcium oxyhydroxide) to increase dissolved oxygen concentrations in groundwater and facilitate biodegradation of the contaminants.

Alternatively, an in situ chemical oxidation (ISCO) technology could be employed. ISCO uses a non-specific oxidizer that reacts rapidly with (naturally occurring) organic substrates and contaminants in the aquifer environment. The oxidation reactions involve breaking chemical bonds and removing electrons. Several oxidants have been effectively used to degrade contaminants in groundwater remediation projects. The oxidants include the following:

- Sodium permanganate
- Potassium permanganate
- Fenton's reagent (hydrogen peroxide with ferric iron)
- Ozone
- Peroxone
- Persulfate

These oxidants vary in stability, efficacy in degrading specific compounds or groups of compounds, handling requirements, and safety concerns. The amount of compound that would be needed would be determined based on the groundwater concentrations collected after the five-year time period.

Regardless of whether enhanced aerobic biodegradation or ISCO is employed, injection wells would need to be installed and an underground injection permit would need to be obtained.

5.2 Plan B: Installation of Additional Landfill Gas and Leachate Extraction Wells

Additional landfill gas and extraction wells would be installed within the waste along the southwesterly waste boundary downgradient of the current extraction wells. The amount and location of the additional extraction wells would be determined based on the concentrations exhibited at the five-year corrective action review.

6.0 Schedule and Maintenance

As stated in Section 3.5.1.1, semiannual groundwater monitoring will be conducted for the monitoring wells and surface water sampling locations. In order to evaluate the effectiveness of MNA, baseline trends will be established. The MNA baseline sampling will be conducted during four semiannual sampling events.

As stated in Section 4.0, following full scale implementation of the approved remedy, extraction system inspections and maintenance will occur on a monthly basis in order to optimize the system operation. Maintenance will include the collection of compliance samples, recording the cumulative volume of leachate removed, calibration of meters and flow control switches, maintenance and repair of submersible pumps, and repair and replacement of pipes, fittings, and other appurtenances that may inevitably break and/or wear down.

A proposed schedule of the activities that will be conducted in addition to the semiannual water quality monitoring and reporting and the scheduled extraction system maintenance is listed below:

Submit CAP	June 2011
Implement Phase I	Fall 2011
Implement Phase II	Fall 2012
Implement Phase III	Fall 2013
Submit Corrective Action Evaluation Report	Fall 2016
Contingency Plans	If necessary, after 2016

In accordance with NCAC Title 15A, Subchapter 13B .1637, the selected remedy will be considered complete when the constituent concentrations in samples collected from the compliance monitoring wells do not exceed the groundwater quality standards for a period of three consecutive years.

7.0 Financial Assurance

A letter dated May 4, 2011, from the Jackson County Finance Office to Mr. Donald Herndon of the Solid Waste Section provides the financial assurance documentation associated with the selected remedy. The letter is included in Appendix E. In accordance with NCAC Title 15A, Subchapter 13B .1637, upon completion of the remedy, Jackson County will submit a report to the DENR documenting that the remedy has been completed. Once the DENR considers corrective action to be complete, Jackson County will be released from the requirements for financial assurance for corrective action per NCAC Title 15A, Subchapter 13B .1628(d).

8.0 References

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Altamont Environmental, Inc. 2010a. *Assessment of Corrective Measures Report*, dated September 7, 2010.

Altamont Environmental, Inc. 2010b. *Spring 2010 Semiannual Water Quality Monitoring Report, Jackson County Municipal Solid Waste Landfill*, dated June 30, 2010.

Altamont Environmental, Inc. 2011a. Corrective Action Permit Modification Application, dated May 13, 2011.

Altamont Environmental, Inc. 2011b. *Spring 2011 Semiannual Water Quality Monitoring Report, Jackson County Municipal Solid Waste Landfill*, June 28, 2011.

DENR, Division of Waste Management, Solid Waste Section. 2010. Letter to Mr. Kenneth Westmoreland, Re: Assessment of Corrective Measures, dated November 12, 2010.

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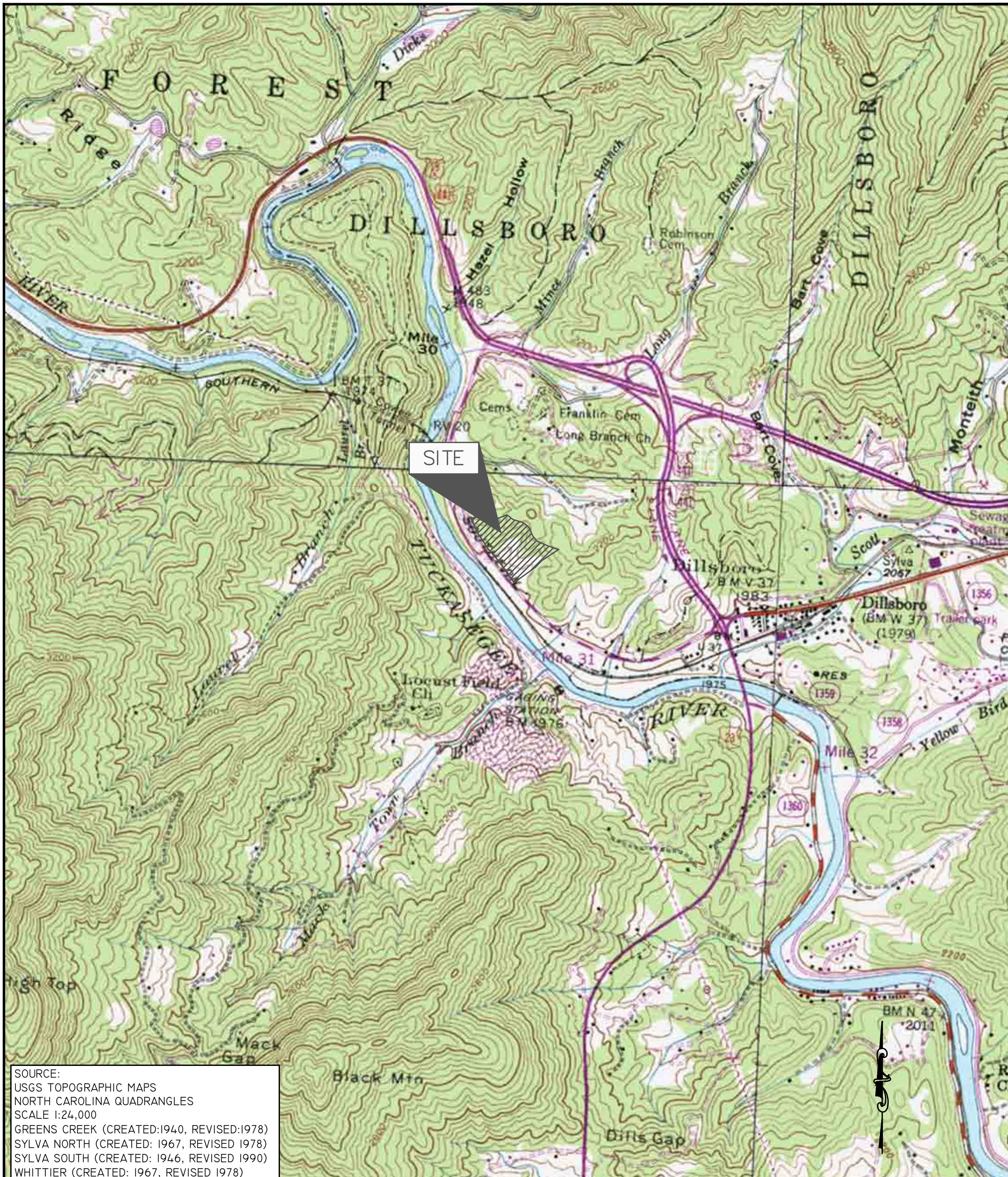
Schroeder, P. R., Dozier, T.S., Zappi, P. A., McEnroe, B. M., Sjostrom, J. W., and Peyton, R. L. 1994. "The Hydrologic Evaluation of Landfill Performance (HELP) Model: Engineering Documentation for Version 3." U.S. Environmental Protection Agency Office of Research and Development.

Tuckaseigee Water & Sewer Authoirty. 2011. Letter to Altamont Environmental, Leachate Extraction System, dated May 16, 2011.

FIGURES



SOURCE:
USGS TOPOGRAPHIC MAPS
NORTH CAROLINA QUADRANGLES
SCALE 1:24,000
GREENS CREEK (CREATED:1940, REVISED:1978)
SYLVA NORTH (CREATED: 1967, REVISED 1978)
SYLVA SOUTH (CREATED: 1946, REVISED 1990)
WHITTIER (CREATED: 1967, REVISED 1978)

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SITE LOCATION MAP

JACKSON COUNTY CLOSED LANDFILL

DILLSBORO, NORTH CAROLINA

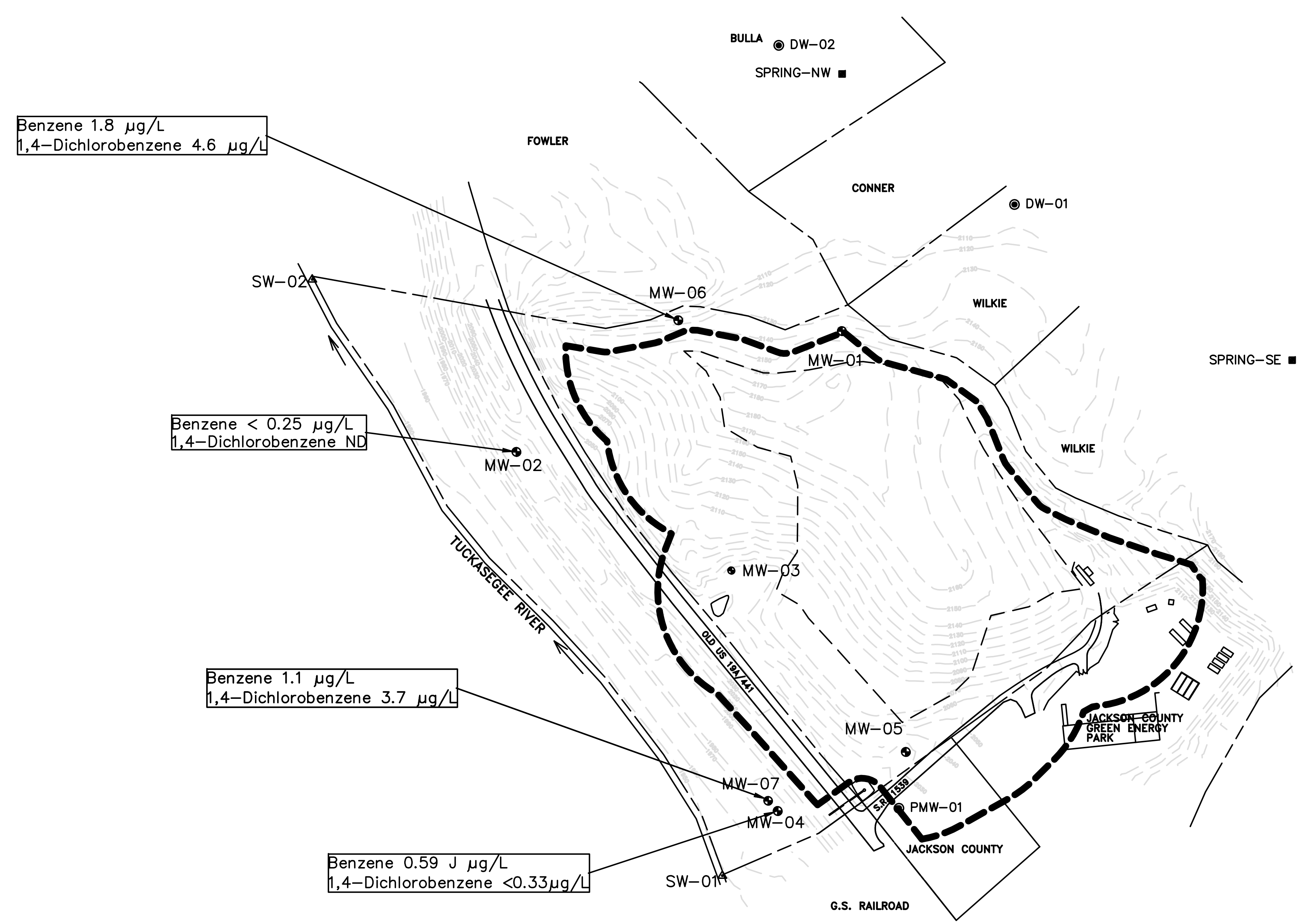
FIGURE

1

DRAWN BY: MARTA VANDUSSEN
PROJECT MANAGER: CHRIS GILBERT
CLIENT: JACKSON COUNTY
DATE: 05/24/2011 UPDATE

SCALE (FEET)
1000 0 1000 2000

P:\JACKSON COUNTY\DILLSBORO GW\FIGURES\CAD\2011\ CAP\FIGURE 1



LEGEND:

MW–1	MONITORING WELL LOCATION
SW–1	SURFACE WATER SAMPLE LOCATION
DW–01	APPROXIMATE DOMESTIC WATER SUPPLY WELL LOCATION
PMW–01	PRIVATE MONITORING WELL LOCATION
SPRING–NW	SPRING LOCATION
FOWLER	PROPERTY OWNER SURNAME
— — —	EDGE OF WASTE BOUNDARY
▬ ▬ ▬	COMPLIANCE BOUNDARY
Benzene 1.1 µg/L ⟶	WATER QUALITY CONTAMINANTS OF CONCERN OUTSIDE OF COMPLIANCE BOUNDARY

NOTE:

1. TOPOGRAPHIC CONTOURS WERE ACQUIRED FROM A McGILL ASSOCIATES DRAWING AND ARE FOR REPRESENTATIVE PURPOSES ONLY.
2. LOCATIONS OF DOMESTIC WATER SUPPLY WELLS DW-01 AND DW-02 ARE APPROXIMATE.
3. GROUNDWATER SAMPLES COLLECTED ON APRIL 13, 2011.
4. 2L STANDARDS: BENZENE 1.0 ug/L AND 1,4-DICHLOROBENZENE 6.0 ug/L.

REV.	DATE	DESCRIPTION	BY	CHK	APV
8	03-02-11	ADD 2L EXCEEDANCE	AWM	CFG	
8	03-02-11	ADD GPS BOUNDARY	EMY	CFG	
7	11-03-06	NEW TITLE BLOCK	JK	CFG	
. . .	. . .	. . .	...	...	
2	05-13-02	UPDATE	SEK	JSM	
1	11-12-01	ORIGINAL	JMC	JPM	

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DRAWN BY: EVAN YURKOVICH
PROJECT MANAGER: CHRIS GILBERT
CLIENT: JACKSON COUNTY
DATE: 6/28/2011

SCALE (FEET)
150 0 150 300

GROUNDWATER COMPLIANCE BOUNDARY

JACKSON COUNTY CLOSED LANDFILL
DILLSBORO,
NORTH CAROLINA

FIGURE
2

P:\JACKSON COUNTY\DILLSBORO GW\FIGURES\CAD\FIGURE GROUNDWATER COMPLIANCE BOUNDARY.DWG

NOTES:

1. BASED ON A METHANE GAS VENTING SITE PLAN BY MCGILL AND ASSOCIATES DATED FEB. 1999 AND A SURVEY COMPLETED BY HUTCHISON-BIGGS & ASSOC. MARCH 6, 2002.
2. ORIGINAL TOPOGRAPHY BASED ON USGS QUADRANGLE MAPS.

LEGEND:

- MONITORING WELL LOCATION
- GAS PROBE LOCATION
- PROPERTY BOUNDARY
- PASSIVE LANDFILL GAS VENTS
- LANDFILL GAS TRENCH(APPROX)
- BUILDING/STRUCTURE
- CURRENT TOPOGRAPHY
- SPRING-EAST
- PRIVATE MONITORING WELL
- LFG HEADER/LATERAL PIPING
- EW-2 LFG VERTICAL WELL (PROPOSED EXTRACTION)
- CS-1 CONDENSATE SUMP
- BLIND FLANGE
- LANDFILL GAS EXTRACTION/FLARE
- WET WELL/AIR COMPRESSOR
- LEACHATE PIPING
- EXISTING TWSA MANHOLE

REV.	DATE	DESCRIPTION	BY	CHK	APV

ALTAMONT ENVIRONMENTAL, INC.
ENGINEERING & HYDROGEOLOGY
231 HAYWOOD STREET, ASHEVILLE, NC 28801
TEL.828.281.3350 FAC.828.281.3351
WWW.ALTAMONTENVIRONMENTAL.COM

DRAWN BY: EVAN YURKOVICH
PROJECT MANAGER: CHRIS GILBERT
CLIENT: JACKSON COUNTY
DATE: 6/28/2011

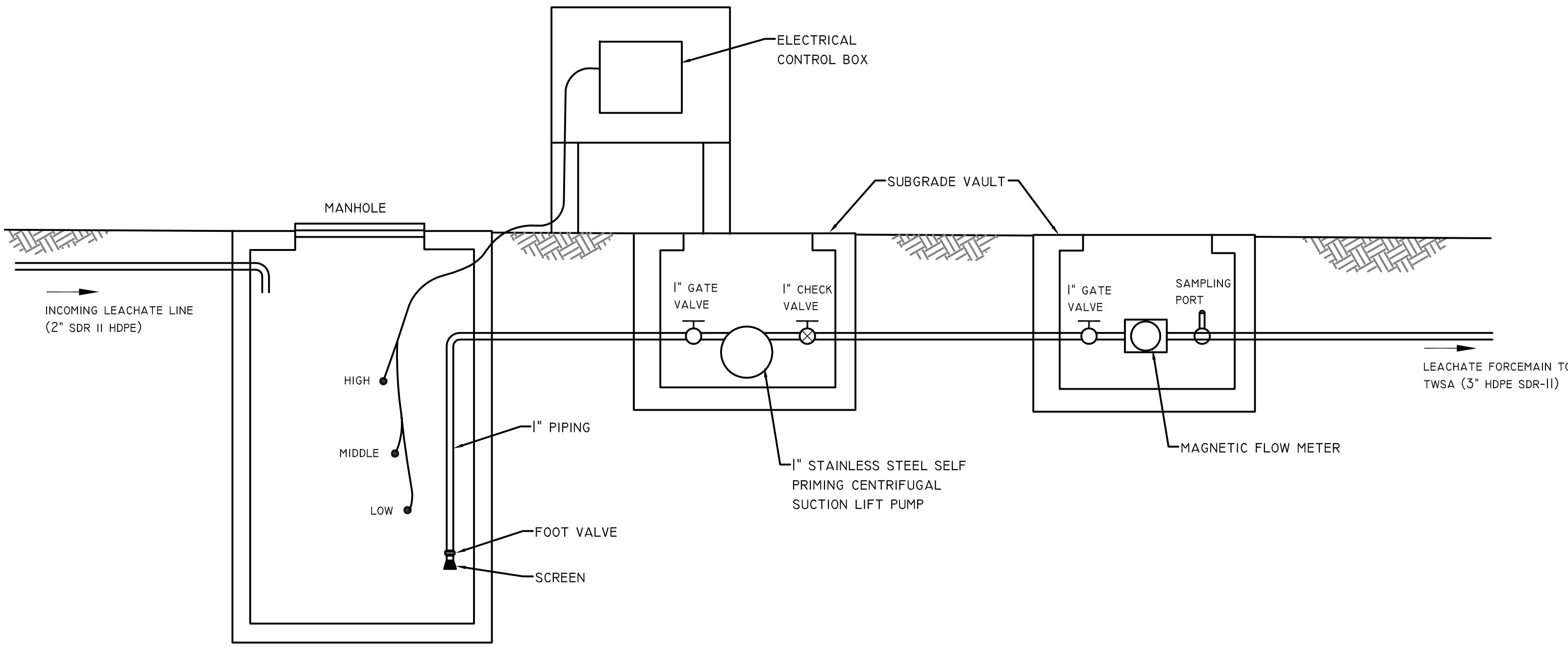
SCALE (FEET)
150 0 150 300

LEACHATE EXTRACTION LAYOUT

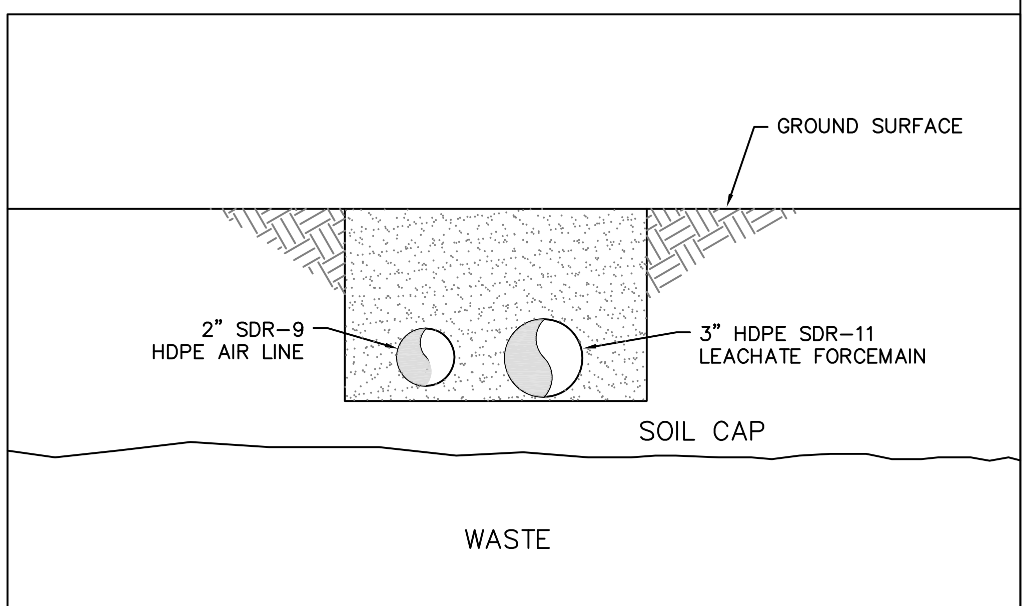
JACKSON COUNTY CLOSED LANDFILL
DILLSBORO,
NORTH CAROLINA

FIGURE 3

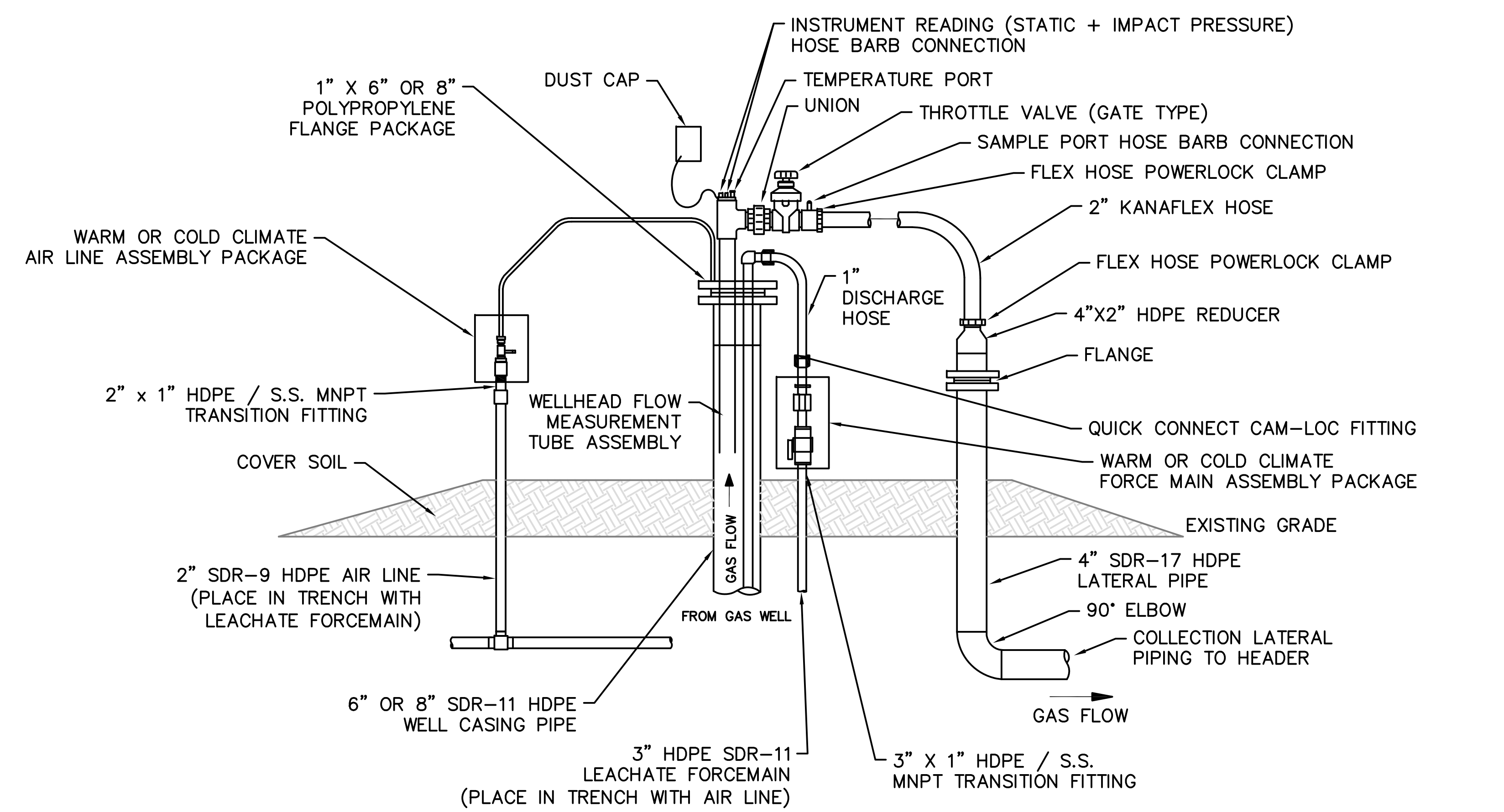
P:\JACKSON COUNTY\DILLSBORO GW\FIGURES\CAD\CAP\LEACHATE EXTRACTION LINES.DWG



ALTAMONT ENVIRONMENTAL, INC. ENGINEERING & HYDROGEOLOGY 231 HAYWOOD STREET, ASHEVILLE, NC 28801 TEL.828.281.3350 FAC.828.281.3351 WWW.ALTAMONTENVIRONMENTAL.COM	WET WELL DETAIL JACKSON COUNTY CLOSED LANDFILL DILLSBORO, NORTH CAROLINA	FIGURE 4
DRAWN BY: EVAN YURKOVICH PROJECT MANAGER: CHRIS GILBERT CLIENT: JACKSON COUNTY DATE: 5/13/2011	NOT TO SCALE	P:\JACKSON COUNTY\DILLSBORO GW\FIGURES\CAD\CAP\LEACHATE FLOW



A/1 TRENCH CROSS-SECTION A-A' NOT TO SCALE



NOTES:

1) PROVIDE HIGH-VISIBILITY TAPE OR PAINT AROUND TOP 1-FOOT OF WELL CASING AND LATERAL PIPE.

2) FLANGE ASSEMBLY REPRESENTS QED 6" OR 8" POLYPROPYLENE DUAL EXTRACTION FLANGE WITH FERNCO WELLHEAD ADAPTER.

A/2 PROPOSED EXTRACTION WELLHEAD (TYPICAL) NOT TO SCALE

REV.	DATE	DESCRIPTION	BY	CHK	APV

ALTAMONT ENVIRONMENTAL, INC.
ENGINEERING & HYDROGEOLOGY
231 HAYWOOD STREET, ASHEVILLE, NC 28801
TEL.828.281.3350 FAC.828.281.3351
WWW.ALTAMONTENVIRONMENTAL.COM

DRAWN BY: CHAD HEARN
PROJECT MANAGER: CHRIS GILBERT
CLIENT: JACKSON COUNTY
DATE: 6/20/2011

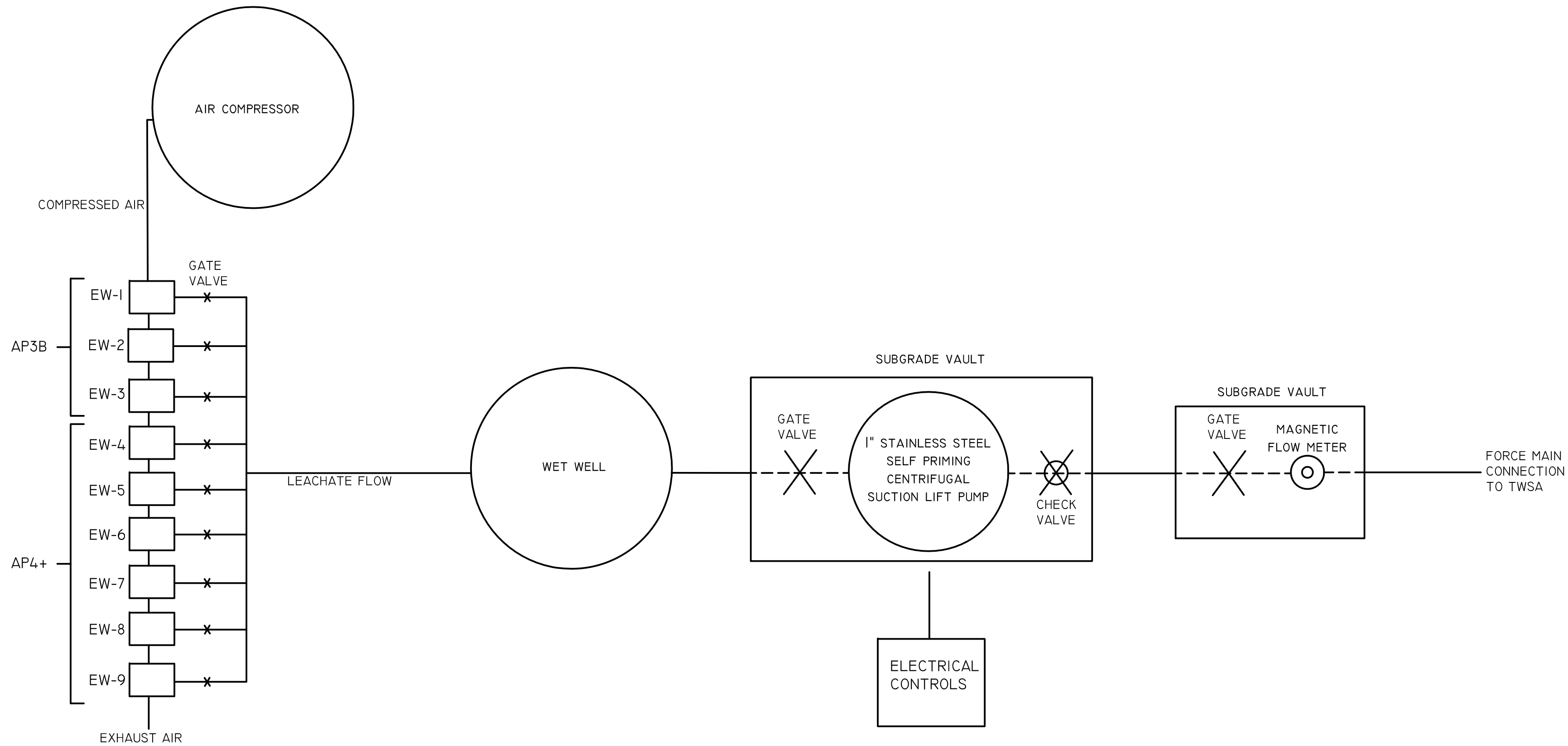
NOT TO SCALE

LEACHATE
EXTRACTION DETAILS

JACKSON COUNTY CLOSED LANDFILL
DILLSBORO,
NORTH CAROLINA

FIGURE
5

P:\JACKSON COUNTY\DILLSBORO GW\FIGURES\CAD\CAP\LEACHATE EXTRACTION LINES.DWG



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DRAWN BY: EVAN YURKOVICH
PROJECT MANAGER: CHRIS GILBERT
CLIENT: JACKSON COUNTY
DATE: 5/13/2011

NOT TO SCALE

PROCESS FLOW DIAGRAM

JACKSON COUNTY CLOSED LANDFILL
DILLSBORO,
NORTH CAROLINA

FIGURE 6

P:\JACKSON COUNTY\DILLSBORO GW\FIGURES\CAD\CAP\LEACHATE FLOW

TABLES

Table 1

Well Construction Details

Jackson County Closed Landfill, Dillsboro, North Carolina

Well ID	Date Drilled	Ground Surface Elevation[1,6,7]	TOC[2] Elevation	Stick Up	Total Well Depth	[4,6,7] Approx. Depth to Bedrock	Approx. Top of Bedrock Elevation	Depth to Top of Screened Interval[4,5]	Depth to Bottom of Screened Interval[4,5]	Top Elevation of Screened Interval	Elevation of Bottom of Screened Interval	Geology of Screened Interval	Source of Well Construction Information
	(mm/dd/yyyy)	(feet)	(feet)	(feet above gs)	(feet bgs)	(feet bgs)	(feet)	(feet bgs)	(feet bgs)	(feet)	(feet)		
MW-01	04/23/1992	2,169.40	2,171.42	2.0	110.5	83.0	2,086.40	95.0	110.0	2,074.40	2,059.40	bedrock	S&ME, Inc.
MW-02	04/22/1992	2,013.15	2,015.38	2.3	63.0	13.0	2,000.15	45.0	60.0	1,968.15	1,953.15	bedrock	S&ME, Inc.
MW-03	04/21/1992	2,044.16	2,045.53	1.3	65.5	57.0	1,987.16	48.5	63.5	1,995.66	1,980.66	partially weathered bedrock	S&ME, Inc.
MW-04	04/21/1992	1,978.68	1,980.77	2.0	43.0	NA[3]	NA	25.0	40.0	1,953.68	1,938.68	saprolite	S&ME, Inc.
MW-05	09/23/1994	2,027.38	2,028.97	1.6	60.0	NA	NA	50.0	60.0	1,977.38	1,967.38	saprolite	AAA Green Bros Well Drilling
MW-06	03/23/2004	2,136.58	2,139.57	3.0	94.0	47.6	2,088.98	84.6	94.6	2,051.98	2,041.98	bedrock	Altamont Environmental, Inc.
MW-07	07/30/2010	1,978.71	1,981.29	2.6	95.0	44.0	1,935.00	70.0	95.0	1,908.71	1,883.71	bedrock	Altamont Environmental, Inc.

Notes:

1. Elevations are measured relative to mean sea level and are based on a survey completed on April 9, 1999 by Davenport & Associates, Inc for wells MW-01 through MW-05.
2. TOC means Top of Casing. gs means ground surface. bgs means below ground surface.
3. NA means Not Applicable.
4. MW-01 through MW-04 Depth to Bedrock and Screened Interval taken from boring logs completed on April 21, 22, and 23, 1992 by S&ME.
5. MW-05 Screened Interval taken from boring log completed on September 23, 1994 by AAA Greene Bros. of Sylva.
6. MW-06 Depth to Bedrock and Screened Interval taken from Altamont boring log completed March 23, 2004. Elevation data taken from a survey completed in March 2004.
7. MW-07 Depth to Bedrock and Screened Interval taken from Altamont boring log completed July 30, 2010. Elevation data taken from a survey completed in August, 2010.

Table 2
Historical Analytical Summary
Jackson County Closed Landfill
Dillsboro, North Carolina

Monitoring Well Identification and Location	Sample Collection Date	Volatile Organic Compound						
		1,1-Dichloroethane µg/L	1,4-Dichlorobenzene µg/L	Benzene µg/L	cis-1,2-Dichloroethene µg/L	Tetrachloroethene µg/L	Trichloroethene µg/L	Vinyl chloride µg/L
	NC 2L Standard	6	6	1.0	70	0.70	3	0.03
MW-1 (Inside Compliance Boundary)	4/22/1999	31	3.5	7.9	7.5	3.7	4.3	2.1
	10/21/1999	32	ND	8.9	13	ND	ND	ND
	4/17/2000	25	ND	6	9.8	ND	ND	ND
	10/9/2000	28	ND	9.8	17	ND	ND	ND
	4/17/2001	20	6.6	8.9	12	ND	ND	ND
	10/9/2001	21	9.7	9.9	18	ND	ND	ND
	4/10/2002	22	11	12	25	ND	ND	ND
	10/9/2002	20	18	14	31	ND	5.5	ND
	4/17/2003	12	ND	8.3	21	ND	ND	ND
	10/20-21/2003	13	8.6	9.6	24	ND	ND	ND
	4/27/2004	10	10	7.3	ND	1.8	ND	1.7
	10/18-19/2004	9.1	11	7.5	ND	ND	ND	ND
	4/19/2005	10	15	8.1	17	ND	ND	ND
	10-12/2005	9.5	13	7.6	18	ND	ND	ND
	4/13/2006	6.1	14	8	17	ND	ND	ND
	10/10-11/2006	5.4	13	6.7	13	ND	ND	ND
	4/3/2007	7.8	15	6.2	11	1.6	1.6	1
	10/9/2007	9.8	17.8	6.8	14.4	1.6	1.7	ND
	4/16/2008	9.0	ND	5.9	10.7	ND	0.95	0.67
	10/2008	7.9	7.6	5.5	8.7	0.70	1.2	ND
	4/8/2009	6.5	5.6	5.8	10	0.49	1.2	ND
	10/6/2009	7.4	5.3	5.0	9.1	0.48	1.0	ND
	4/13/2010	6.6	11.0	5.2	10.8	0.69	1.3	ND
	10/26/2010	5.0	8.5	3.5	9.2	ND	1.1	ND
	4/13/2011	5.0	ND	2.7	7.7	ND	0.97	ND

Table 2
Historical Analytical Summary
Jackson County Closed Landfill
Dillsboro, North Carolina

Monitoring Well Identification and Location	Sample Collection Date	Volatile Organic Compound						
		1,1-Dichloroethane µg/L	1,4-Dichlorobenzene µg/L	Benzene µg/L	cis-1,2-Dichloroethene µg/L	Tetrachloroethene µg/L	Trichloroethene µg/L	Vinyl chloride µg/L
	NC 2L Standard	6	6	1.0	70	0.70	3	0.03
MW-2 (Outside Compliance Boundary)	4/22/1999	3.7	ND	ND	ND	ND	1.1	ND
	10/21/1999	ND	ND	ND	ND	ND	ND	ND
	4/17/2000	ND	ND	ND	ND	ND	ND	ND
	10/9/2000	6.5	ND	ND	ND	ND	ND	ND
	4/17/2001	ND	ND	ND	5.5	ND	ND	ND
	10/9/2001	5.8	ND	ND	ND	ND	ND	ND
	4/10/2002	ND	ND	ND	ND	ND	ND	ND
	10/9/2002	6.7	ND	ND	ND	ND	ND	ND
	4/17/2003	ND	ND	ND	ND	ND	ND	ND
	10/20-21/2003	ND	ND	ND	ND	ND	ND	ND
	4/27/2004	2.6	ND	ND	ND	ND	ND	ND
	10/18-19/2004	ND	ND	ND	ND	ND	ND	ND
	4/19/2005	ND	ND	ND	ND	ND	ND	ND
	10-12/2005	ND	ND	ND	ND	ND	ND	ND
	4/13/2006	ND	ND	ND	ND	ND	ND	ND
	10/10-11/2006	ND	ND	ND	ND	ND	ND	ND
	4/3/2007	1.1	0.68	ND	1.2	ND	ND	1
	10/9/2007	3.3	1.8	0.42	5.8	ND	ND	ND
	4/15/2008	1.1	ND	ND	1.2	ND	ND	ND
	10/2008	ND	0.58	ND	1.4	ND	ND	ND
	4/8/2009	0.67	ND	ND	0.56	ND	ND	ND
	10/22/2009	0.57	ND	ND	0.82	ND	ND	ND
	4/13/2010	0.43	ND	ND	0.87	ND	0.62	ND
	10/27/2010	0.64	ND	ND	1.2	ND	ND	ND
	4/13/2011	ND	ND	ND	0.50	ND	ND	ND

Table 2
Historical Analytical Summary
Jackson County Closed Landfill
Dillsboro, North Carolina

Monitoring Well Identification and Location	Sample Collection Date	Volatile Organic Compound						
		1,1-Dichloroethane µg/L	1,4-Dichlorobenzene µg/L	Benzene µg/L	cis-1,2-Dichloroethene µg/L	Tetrachloroethene µg/L	Trichloroethene µg/L	Vinyl chloride µg/L
	NC 2L Standard	6	6	1.0	70	0.70	3	0.03
MW-3 (Inside Compliance Boundary)	4/22/1999	**7.0**	4.8	**4.8**	5.5	**1.0**	1.3	**1.2**
	10/21/1999	ND	ND	ND	5.8	ND	ND	ND
	4/17/2000	ND	5.1	ND	ND	ND	ND	ND
	10/9/2000	**8.2**	**10.0**	**6.1**	9.4	ND	ND	ND
	4/17/2001	5.4	**7.2**	ND	7.6	ND	ND	ND
	10/9/2001	**6.5**	**11.0**	ND	7.3	ND	ND	ND
	4/10/2002	**6.0**	**8.7**	ND	7.8	ND	ND	ND
	10/9/2002	**10.0**	ND	ND	10.0	ND	ND	ND
	4/17/2003	ND	**8.3**	ND	ND	ND	ND	ND
	10/20-21/2003	5.8	**17.0**	ND	8.9	ND	ND	ND
	4/27/2004	5.4	**14.0**	**3.6**	6.7	ND	ND	ND
	10/18-19/2004	**6.5**	**18.0**	ND	6.3	ND	ND	ND
	4/19/2005	ND	**14.0**	ND	5.2	ND	ND	ND
	10-12/2005	**6.3**	**19.0**	ND	7.3	ND	ND	ND
	4/13/2006	ND	**12.0**	ND	5.4	ND	ND	ND
	10/10-11/2006	ND	ND	ND	6.7	ND	ND	ND
	4/3/2007	2.6	**11.0**	**2.0**	4.4	0.23	0.27	**1.0**
	10/9/2007	5.9	**18.4**	**1.7**	10.6	ND	ND	ND
	4/16/2008	1.1	ND	**1.1**	2.8	ND	ND	ND
	10/2008	2.7	**12.6**	**1.3**	5.1	ND	ND	ND
	4/7/2009	1.0	4.9	0.79	2.2	ND	ND	ND
	10/6/2009	1.7	**8.3**	**1.7**	3.6	ND	ND	ND
	4/13/2010	0.47	3.5	**1.3**	1.0	ND	0.52	ND
	10/26/2010	2.7	**9.5**	**1.3**	4.3	ND	ND	ND
	4/13/2011	ND	ND	0.43	0.70	ND	ND	ND

Table 2
Historical Analytical Summary
Jackson County Closed Landfill
Dillsboro, North Carolina

Monitoring Well Identification and Location	Sample Collection Date	Volatile Organic Compound						
		1,1-Dichloroethane µg/L	1,4-Dichlorobenzene µg/L	Benzene µg/L	cis-1,2-Dichloroethene µg/L	Tetrachloroethene µg/L	Trichloroethene µg/L	Vinyl chloride µg/L
	NC 2L Standard	6	6	1.0	70	0.70	3	0.03
MW-4 (Outside Compliance Boundary)	4/22/1999	4	**7.9**	**2.8**	24	**3.9**	3.5	**2**
	10/21/1999	ND	**6.7**	ND	20	ND	ND	ND
	4/17/2000	ND	**6.2**	ND	15	ND	ND	ND
	10/9/2000	ND	5.7	ND	19	ND	ND	ND
	4/17/2001	ND	**6.2**	ND	9.6	ND	ND	ND
	10/9/2001	ND	**7.8**	ND	17	ND	ND	ND
	4/10/2002	ND	**7.2**	ND	16	ND	ND	ND
	10/9/2002	ND	ND	ND	19	ND	ND	ND
	4/17/2003	ND	ND	ND	ND	ND	ND	ND
	10/20-21/2003	ND	**6.3**	ND	18	ND	ND	ND
	4/27/2004	ND	**7.5**	ND	13	ND	ND	ND
	10/18-19/2004	ND	**6.6**	ND	9.7	ND	ND	ND
	4/19/2005	ND	ND	ND	8.3	ND	ND	ND
	10-12/2005	ND	**8.9**	ND	14	ND	ND	ND
	4/13/2006	ND	**7.8**	ND	11	ND	ND	ND
	10/10-11/2006	ND	ND	ND	13	ND	ND	ND
	4/3/2007	0.50	**8.4**	**1.3**	11	0.38	0.38	**1**
	10/9/2007	3.1	**11.3**	**1.8**	18.7	ND	ND	**0.97**
	4/15/2008	0.57	ND	**1.2**	11.0	ND	ND	**0.76**
	10/2008	0.52	**9.3**	**1.5**	10.7	ND	ND	**0.97**
	4/8/2009	0.44	**7.1**	**1.2**	9.6	ND	ND	**0.78**
	10/7/2009	0.37	5.6	**1.1**	8.8	ND	ND	**0.90**
	4/13/2010	ND	2.9	0.55	4.3	ND	0.47	ND
	10/27/2010	ND	4.8	**1.1**	5.6	ND	ND	ND
	4/13/2011	ND	ND	0.59	3.9	ND	ND	ND

Table 2
Historical Analytical Summary
Jackson County Closed Landfill
Dillsboro, North Carolina

Monitoring Well Identification and Location	Sample Collection Date	Volatile Organic Compound						
		1,1-Dichloroethane µg/L	1,4-Dichlorobenzene µg/L	Benzene µg/L	cis-1,2-Dichloroethene µg/L	Tetrachloroethene µg/L	Trichloroethene µg/L	Vinyl chloride µg/L
	NC 2L Standard	6	6	1.0	70	0.70	3	0.03
MW-5 (Inside Compliance Boundary)	4/22/1999	3	**14**	**3.4**	36	ND	ND	**2.2**
	10/21/1999	ND	**14**	ND	44	ND	ND	ND
	4/17/2000	ND	**13**	ND	44	ND	ND	ND
	10/9/2000	ND	**12**	ND	44	ND	ND	ND
	4/17/2001	ND	**15**	ND	43	ND	ND	ND
	10/9/2001	ND	**13**	ND	30	ND	ND	ND
	4/10/2002	ND	ND	ND	41	ND	ND	ND
	10/9/2002	ND	ND	ND	38	ND	ND	ND
	4/17/2003	ND	**13**	ND	32	ND	ND	ND
	10/20-21/2003	ND	**11**	ND	32	ND	ND	ND
	4/27/2004	ND	**16**	**2.3**	35	ND	ND	**2.4**
	10/18-19/2004	ND	**15**	ND	27	ND	ND	ND
	4/19/2005	N/S	N/S	N/S	N/S	N/S	N/S	N/S
	10-12/2005	N/S	N/S	N/S	N/S	N/S	N/S	N/S
	4/13/2006	N/S	N/S	N/S	N/S	N/S	N/S	N/S
	10/10-11/2006	N/S	N/S	N/S	N/S	N/S	N/S	N/S
	4/3/2007	0.49	**17**	**1.9**	32	ND	ND	**1**
	10/9/2007	ND	**18.8**	**1.6**	38.1	ND	ND	**1.4**
	4/16/2008	0.35	ND	0.56	27.4	ND	ND	**0.93**
	10/2008	ND	**16.2**	**1.2**	21.6	ND	ND	**0.78**
	4/7/2009	0.32	**15.9**	**1**	21.6	ND	ND	**0.99**
	10/7/2009	ND	**13.1**	**1.2**	18.4	ND	ND	**0.93**
	4/13/2010	ND	**12.1**	**2**	17.8	ND	0.55	**1.5**
	10/26/2010	ND	**13.9**	**1.8**	17.3	ND	ND	**1.6**
	4/13/2011	ND	ND	**1.5**	17.8	ND	ND	**1.1**

Table 2
Historical Analytical Summary
Jackson County Closed Landfill
Dillsboro, North Carolina

Monitoring Well Identification and Location	Sample Collection Date	Volatile Organic Compound						
		1,1-Dichloroethane µg/L	1,4-Dichlorobenzene µg/L	Benzene µg/L	cis-1,2-Dichloroethene µg/L	Tetrachloroethene µg/L	Trichloroethene µg/L	Vinyl chloride µg/L
	NC 2L Standard	6	6	1.0	70	0.70	3	0.03
MW-6 (Outside Compliance Boundary)	4/27/2004	**13**	**14**	**6.3**	18	**1.8**	ND	ND
	10/18-19/2004	**12**	**9.5**	**5.7**	13	ND	ND	ND
	4/19/2005	**10**	**11**	**6.4**	22	ND	ND	ND
	10-12/2005	**7.9**	**11**	ND	16	ND	ND	ND
	4/13/2006	**7.3**	**14**	**6.3**	17	ND	ND	ND
	10/10-11/2006	**7.9**	ND	**5.5**	15	ND	ND	ND
	4/3/2007	**9.7**	**13**	**4.7**	12	**1.3**	1.5	**1**
	10/9/2007	**11.3**	**11.2**	**3.3**	13.2	**1.5**	1.5	ND
	4/15/2008	**11.8**	ND	**1.9**	7.7	ND	ND	ND
	10/2008	**12.4**	2.1	**1.8**	7.2	ND	0.86	ND
	4/7/2009	**13**	3.2	**1.4**	7.1	**0.81**	1.4	ND
	10/6/2009	2.7	1.3	0.56	4.2	ND	ND	ND
	4/13/2010	1.1	3.9	**1.7**	5.9	ND	ND	ND
	10/26/2010	5.4	**7.9**	**4.3**	12.0	ND	1.2	ND
	4/13/2011	0.85	4.6	**1.8**	5.4	ND	ND	ND
MW-07 (Outside Compliance Boundary)	8/11/2010	0.87	0.51	0.76	4.9	ND	1.0	ND
	4/13/2011	0.54	3.7	**1.1**	8.7	ND	ND	ND

Notes

1. NC 2L Standard - Groundwater quality standard promulgated under Title 15 North Carolina Administrative Code Subchapter 2L (Department of Environment and Natural Resources). Last amended January 1, 2010.
2. µg/L - micrograms per liter
3. ND - not detected
4. N/S - not sampled
5. Bold values indicate concentrations above associated North Carolina GW Standards.
6. The VOCs shown on this table have historically been detected more frequently and at higher concentrations than other VOCs analyzed during the semiannual monitoring. See specific semiannual monitoring reports for the complete datasets.
7. Some detections contained "J" or estimated values. See respective analytical reports for value.

Table 3
Historical Groundwater Level Elevations
Jackson County Closed Landfill
Dillsboro, North Carolina

Well	Date	Depth to Water (feet-bgs)	Depth to Water (feet below TOC)	Groundwater Elevation (feet)
MW-1	4/22/1999	92.5	94.49	2076.93
	10/21/1999	91.2	93.20	2078.22
	4/17/2000	93.6	95.60	2075.82
	10/9/2000	93.3	95.29	2076.13
	4/17/2001	95.3	97.30	2074.12
	10/9/2001	95.1	97.10	2074.32
	4/10/2002	96.2	98.15	2073.27
	10/9/2002	96.6	98.55	2072.87
	4/17/2003	95.7	97.70	2073.72
	10/20-21/2003	93.1	95.12	2076.30
	4/27/2004	95.4	97.40	2074.02
	10/18-19/2004	95.0	97.03	2074.39
	4/19/2005	93.6	95.62	2075.80
	10-12/2005	94.4	96.40	2075.02
	4/13/2006	96.7	98.69	2072.73
	10/10-11/2006	98.0	99.99	2071.43
	4/3/2007	99.6	101.56	2069.86
	10/9/2007	100.7	102.70	2068.72
	4/16/2008	102.9	104.89	2066.53
	10/2008	103.4	105.41	2066.01
	4/8/2009	104.4	106.41	2065.01
	10/6/2009	101.7	103.73	2067.69
	4/13/2010	96.1	98.10	2073.32
	8/18/2010	95.5	97.50	2073.92
	8/25/2010	99.2	101.20	2070.22
	10/26/2010	96.3	98.31	2073.11
	4/13/2011	99.5	101.48	2069.94
MW-2	4/22/1999	19.0	21.19	1994.19
	10/21/1999	24.3	26.45	1988.93
	4/17/2000	24.2	26.40	1988.98
	10/9/2000	24.3	26.50	1988.88
	4/17/2001	24.3	26.50	1988.88
	10/9/2001	24.5	26.70	1988.68
	4/10/2002	24.4	26.60	1988.78
	10/9/2002	24.7	26.92	1988.46
	4/17/2003	24.8	26.98	1988.40
	10/20-21/2003	27.9	30.14	1985.24
	4/27/2004	24.4	26.57	1988.81
	10/18-19/2004	24.6	26.82	1988.56
	4/19/2005	21.4	23.61	1991.77
	10-12/2005	23.4	25.63	1989.75
	4/13/2006	23.2	25.39	1989.99
	10/10-11/2006	24.2	26.38	1989.00
	4/3/2007	23.8	25.95	1989.43
	10/9/2007	25.2	27.41	1987.97
	4/15/2008	24.4	26.57	1988.81
	10/2008	24.9	27.14	1988.24
	4/8/2009	24.3	26.45	1988.93
	10/22/2009	23.1	25.30	1990.08
	4/13/2010	21.8	23.97	1991.41
	8/18/2010	23.2	25.40	1989.98
	8/25/2010	27.0	29.16	1986.22
	10/27/2010	25.0	27.22	1988.16
	4/13/2011	23.7	25.87	1989.51

Table 3
Historical Groundwater Level Elevations
Jackson County Closed Landfill
Dillsboro, North Carolina

Well	Date	Depth to Water (feet-bgs)	Depth to Water (feet below TOC)	Groundwater Elevation (feet)
MW-3	4/22/1999	50.2	51.64	1993.89
	10/21/1999	51.9	53.31	1992.22
	4/17/2000	49.9	51.25	1994.28
	10/9/2000	52.4	53.82	1991.71
	4/17/2001	49.5	50.90	1994.63
	10/9/2001	51.6	53.02	1992.51
	4/10/2002	50.8	52.20	1993.33
	10/9/2002	52.4	53.85	1991.68
	4/17/2003	47.1	48.48	1997.05
	10/20-21/2003	50.3	51.72	1993.81
	4/27/2004	49.1	50.47	1995.06
	10/18-19/2004	49.3	50.73	1994.80
	4/19/2005	46.4	47.83	1997.70
	10-12/2005	50.1	51.47	1994.06
	4/13/2006	48.9	50.29	1995.24
	10/10-11/2006	51.7	53.14	1992.39
	4/3/2007	49.1	50.50	1995.03
	10/9/2007	53.4	54.84	1990.69
	4/16/2008	49.4	50.84	1994.69
	10/2008	54.3	55.69	1989.84
	4/7/2009	48.7	50.11	1995.42
	10/6/2009	50.4	51.78	1993.75
	4/13/2010	46.8	48.20	1997.33
	8/18/2010	NMT	NMT	NMT
	8/25/2010	53.9	55.25	1990.28
	10/26/2010	51.3	52.68	1992.85
	4/13/2011	46.6	48.02	1997.51
MW-4	4/22/1999	26.5	28.63	1952.14
	10/21/1999	27.5	29.58	1951.19
	4/17/2000	26.0	28.05	1952.72
	10/9/2000	28.3	30.37	1950.40
	4/17/2001	26.9	28.95	1951.82
	10/9/2001	27.6	29.65	1951.12
	4/10/2002	26.5	28.60	1952.17
	10/9/2002	27.4	29.48	1951.29
	4/17/2003	25.4	27.47	1953.30
	10/20-21/2003	31.3	33.42	1947.35
	4/27/2004	26.2	28.25	1952.52
	10/18-19/2004	26.2	28.32	1952.45
	4/19/2005	25.1	27.19	1953.58
	10-12/2005	27.1	29.20	1951.57
	4/13/2006	26.7	28.79	1951.98
	10/10-11/2006	27.5	29.59	1951.18
	4/3/2007	26.4	28.49	1952.28
	10/9/2007	28.2	30.35	1950.42
	4/15/2008	26.4	28.51	1952.26
	10/2008	28.4	30.54	1950.23
	4/8/2009	26.4	28.45	1952.32
	10/7/2009	25.6	27.65	1953.12
	4/13/2010	24.7	26.82	1953.95
	8/18/2010	26.7	28.80	1951.97
	8/25/10	28.5	30.63	1950.14
	10/27/2010	26.7	28.81	1951.96
	4/13/2011	24.6	26.70	1954.07

Table 3
Historical Groundwater Level Elevations
Jackson County Closed Landfill
Dillsboro, North Carolina

Well	Date	Depth to Water (feet-bgs)	Depth to Water (feet below TOC)	Groundwater Elevation (feet)
MW-5	4/22/1999	46.7	48.25	1980.72
	10/21/1999	47.7	49.25	1979.72
	4/17/2000	48.6	50.20	1978.77
	10/9/2000	49.5	51.05	1977.92
	4/17/2001	50.2	51.75	1977.22
	10/9/2001	50.5	52.05	1976.92
	4/10/2002	50.8	52.40	1976.57
	10/9/2002	51.3	52.86	1976.11
	4/17/2003	48.9	50.48	1978.49
	10/20-21/2003	48.7	50.34	1978.63
	4/27/2004	48.6	50.20	1978.77
	10/18-19/2004	48.7	50.34	1978.63
	4/19/2005	48.7	50.34	1978.63
	10-12/2005	NMT	NMT	NMT
	4/13/2006	47.4	48.99	1979.98
	10/10-11/2006	48.9	50.54	1978.43
	4/3/2007	49.0	50.63	1978.34
	10/9/2007	50.0	51.62	1977.35
	4/16/2008	49.9	51.50	1977.47
	10/2008	50.8	52.40	1976.57
	4/7/2009	50.5	52.08	1976.89
	10/7/2009	48.5	50.12	1978.85
	4/13/2010	44.0	45.58	1983.39
	8/18/2010	NMT	NMT	NMT
	8/25/2010	NMT	NMT	NMT
	10/26/2010	46.2	47.76	1981.21
	4/13/2011	46.6	48.22	1980.75
MW-6	4/27/2004	81.7	84.65	2054.92
	10/18-19/2004	79.8	82.85	2056.72
	4/19/2005	75.8	78.80	2060.77
	10-12/2005	78.0	80.99	2058.58
	4/13/2006	82.3	85.26	2054.31
	10/10-11/2006	84.3	87.30	2052.27
	4/3/2007	86.3	89.25	2050.32
	10/9/2007	87.1	90.07	2049.50
	4/15/2008	89.2	92.23	2047.34
	10/2008	89.4	92.36	2047.21
	4/7/2009	90.3	93.35	2046.22
	10/6/2009	85.5	88.51	2051.06
	4/13/2010	75.8	78.77	2060.80
	8/18/2010	77.6	80.60	2058.97
	8/25/2010	82.1	85.12	2054.45
	10/26/2010	80.3	83.33	2056.24
	4/13/2011	84.8	87.83	2051.74
MW-7	8/10/2010	29.9	32.52	1948.47
	8/25/2010	33.2	35.85	1945.44
	4/13/2011	29.3	31.92	1949.37

Notes:
1. NMT = no measurement taken.
2. feet-bgs = feet below ground surface.
3. TOC = top of casing.

Table 4
Summary of Extraction Well Construction
Jackson County Closed Landfill
Dillsboro, North Carolina

Well ID	Date Drilled	Boring Diameter (inches)	Well Diameter (inches)	Stick-up (Ft-ags)	Total Well Depth (Ft-bgs)	Depth to Top of Perforation (Ft-bgs)	Depth to Bottom of Perforation (Ft-bgs)	Screen Length (Feet)	Source of Information
EW-1	3/20/2004	36	4	5	69	42	67	25	Shaw EMCON/OWT, Inc.
EW-2	3/17/2004	36	4	4	82	50	80	30	Shaw EMCON/OWT, Inc.
EW-3	3/17/2004	36	4	5	90	58	88	30	Shaw EMCON/OWT, Inc.
EW-4	1/5/2005	36	6	4	60	20	58	38	American Environmental Group, Ltd.
EW-5	1/6/2005	36	6	4	50	20	48	28	American Environmental Group, Ltd.
EW-6	1/6/2005	36	6	4	40	20	38	18	American Environmental Group, Ltd.
EW-7	1/6/2005	36	6	4	40	20	38	18	American Environmental Group, Ltd.
EW-8	1/6/2005	36	6	4	60	20	58	38	American Environmental Group, Ltd.
EW-9	1/5/2005	36	6	4	70	20	68	48	American Environmental Group, Ltd.

Notes:
1. Ft-ags - Feet above ground surface
2. Ft-bgs - Feet below ground surface

Table 5
Extraction Well Leachate VOC Analytical Results
Jackson County Closed Landfill
Dillsboro, North Carolina

Sample Location	Date	Volatile Organic Compounds										
		Acetone	Benzene	Chlorobenzene	1,4-Dichlorobenzene	cis-1,2-Dichloroethene	1,2-Dichloropropane	Ethylbenzene	4-Methyl-2-pentanone (MIBK)	Styrene	Toluene	Total Xylenes
EW-4	2/21/2011	32.7	**2.0**	1.8	**6.9**	2.3	< 1.0	22.5	6.0	< 1.0	2.2	24.1
EW-9	2/21/2011	42.3	**1.6**	3.2	**11.5**	2.6	0.27 J	31.9	< 5.0	1.8	1.5	8.0
2L Standard		6,000	1	50	6	70	0.6	600	NE	70	600	500

Notes:

1. VOC Concentrations are in micrograms per liter (µg/L).
2. 2L Standard from "North Carolina Administrative Code, Title 15A: Department of Environment and Natural Resources, Subchapter 2L - Groundwater Classifications and Standards," NC DENR, amended on January 1, 2010.
3. **Bold** indicates exceedance of a 2L Standard.
4. This table presents detected compounds only. For complete analyses and detection limits see the individual analytical reports.
5. NE denotes that a 2L Standard is not established.

Table 6
Estimated Volume of Water Infiltrating through Landfill
Jackson County Closed Landfill
Dillsboro, North Carolina

Projected Surface Area of the Soil Cap above Waste	7.3	acres
Estimated from Site Survey		
Estimate Number 1		
Using the HELP Model		
Infiltration Rate using the HELP Model	19	inches per year
Estimated Volume	3.766	MG per year
Estimate Number 2		
From *Ground-water Recharge in North Carolina* (Heath 1994)		
Published Recharge Rate for the Blue Ridge area	600,000	gallons per day per square mile
Estimated Volume	2.498	MG per year
Average of Estimate 1 and 2	3.132	MG per year

Notes:

1. MG means 1,000,000 gallons

2. Estimated Volume (Estimate Number 1) = 19 inches per year infiltration rate from HELP model / 12 inches per foot * 7.3 acres of projected surface area of the soil cap above waste * 43,560 square feet per acre * 7.48 gallons per cubic foot / 1,000,000 gallons per MG

3. Estimated Volume (Estimate Number 2) = 600,000 gallons per day per square mile from *Groundwater Recharge in North Carolina* (Heath 1994) / 640 acres per square mile * 365 days per year * 7.3 acres of projected surface area of the soil cap above waste / 1,000,000 gallons per MG

4. Heath, Ralph C., 1994. *Ground-water Recharge in North Carolina.* North Carolina State University.

Table 7
Estimated Mass of Contaminants to be Removed Using the Approved Remedy
Jackson County Closed Landfill
Dillsboro, North Carolina

Contaminants of Concern	Year Following CAP Implementation	Volume to be Removed *(gallons)*	Concentration in EW-9 *(µg/L)*	Concentration in EW-4 *(µg/L)*	Average Concentration *(µg/L)*	Mass to be Removed *(pounds)*
Benzene	Year 1	1,200,000	1.6	2.0	1.8	0.018
	Year 2	1,200,000	1.6	2.0	1.8	0.018
	Year 3	1,200,000	1.6	2.0	1.8	0.018
	Year 4	1,200,000	1.6	2.0	1.8	0.018
	Year 5	1,200,000	1.6	2.0	1.8	0.018
1,4-Dichlorobenzene	Year 1	1,200,000	11.5	6.9	9.2	0.092
	Year 2	1,200,000	11.5	6.9	9.2	0.092
	Year 3	1,200,000	11.5	6.9	9.2	0.092
	Year 4	1,200,000	11.5	6.9	9.2	0.092
	Year 5	1,200,000	11.5	6.9	9.2	0.092
Total mass to be removed in the first five years of operation						0.55

Notes:

1. CAP means corrective action plan
2. Volume to be treated based upon February 21, 2011 landfill gas extraction well dewatering event
3. Concentration in EW-9 and EW-4 based upon samples collected on February 21, 2011
4. µg/L - micrograms per liter
5. Average concentration = (concentration in EW-9 + concentration in EW-4) / 2
6. Mass to be removed = (Average concentration in µg/L * 1,200,000 gallons volume to be removed / 1,000,000 gallons * 8.34 pounds per MG per milligram per liter / 1,000 micrograms in a milligram
7. MG means 1,000,000 gallons

APPENDICES

APPENDIX A

Leachate Analytical Report

Pace Analytical
www.pacelabs.com

Pace Analytical Services, Inc.
205 East Meadow Road - Suite A
Eden, NC 27288
(336)623-8921

Pace Analytical Services, Inc.
2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

March 08, 2011

Mr. Joel Lenk
Altamont Environmental
321 Haywood Street
Asheville, NC 28801

RE: Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

Dear Mr. Lenk:

Enclosed are the analytical results for sample(s) received by the laboratory on February 21, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Lorri Patton

Lorri Patton

lorri.patton@pacelabs.com
Project Manager

Enclosures

CERTIFICATIONS

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Idaho Certification #: MN00064
Illinois Certification #: 200011
Iowa Certification #: 368
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Mexico Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
North Dakota Certification #: R-036A
Ohio VAP Certification #: CL101
Oklahoma Certification #: D9921
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Washington Certification #: C754
Wisconsin Certification #: 999407970
A2LA cert#

Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078
Louisiana/LELAP Certification #: 04034
New Jersey Certification #: NC012
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
Pennsylvania Certification #: 68-00784
South Carolina Certification #: 99006001
South Carolina Drinking Water Cert. #: 99006003
Virginia Certification #: 00213
Connecticut Certification #: PH-0104
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Louisiana DHH Drinking Water # LA 100031
West Virginia Certification #: 357

Asheville Certification IDs

2225 Riverside Dr., Asheville, NC 28804
Connecticut Certification #: PH-0106
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
New Jersey Certification #: NC011
North Carolina Bioassay Certification #: 9
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
Pennsylvania Certification #: 68-03578
South Carolina Bioassay Certification #: 99030002
South Carolina Certification #: 99030001
Virginia Certification #: 00072
West Virginia Certification #: 356

SAMPLE SUMMARY

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

Lab ID	Sample ID	Matrix	Date Collected	Date Received
9288220001	**EW-4**	Water	02/21/11 10:20	02/21/11 14:15
9288220002	**EW-9**	Water	02/21/11 12:00	02/21/11 14:15
9288220003	**TRIP BLANK**	Water	02/21/11 00:00	02/21/11 14:15

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SAMPLE ANALYTE COUNT

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
9288220001	**EW-4**	EPA 6010	JMW	14	PASI-A
		EPA 6020	RJS	1	PASI-M
		EPA 7470	EWS	1	PASI-A
		EPA 8260	MCK	53	PASI-C
9288220002	**EW-9**	EPA 6010	JMW	14	PASI-A
		EPA 6020	RJS	1	PASI-M
		EPA 7470	EWS	1	PASI-A
		EPA 8260	MCK	53	PASI-C
9288220003	**TRIP BLANK**	EPA 8260	MCK	53	PASI-C

ANALYTICAL RESULTS

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

Sample: EW-4 **Lab ID: 9288220001** Collected: 02/21/11 10:20 Received: 02/21/11 14:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Antimony	ND	ug/L	5.0	2.6	1	02/28/11 14:30	03/01/11 17:36	7440-36-0	
Arsenic	**21.4**	ug/L	5.0	2.7	1	02/28/11 14:30	03/01/11 17:36	7440-38-2	
Barium	**305**	ug/L	5.0	0.20	1	02/28/11 14:30	03/01/11 17:36	7440-39-3	
Beryllium	ND	ug/L	1.0	0.10	1	02/28/11 14:30	03/01/11 17:36	7440-41-7	
Cadmium	ND	ug/L	1.0	0.50	1	02/28/11 14:30	03/01/11 17:36	7440-43-9	
Chromium	**19.4**	ug/L	5.0	0.40	1	02/28/11 14:30	03/01/11 17:36	7440-47-3	
Cobalt	**32.7**	ug/L	5.0	0.60	1	02/28/11 14:30	03/01/11 17:36	7440-48-4	
Copper	**4.7J**	ug/L	5.0	0.30	1	02/28/11 14:30	03/01/11 17:36	7440-50-8	
Lead	ND	ug/L	5.0	4.0	1	02/28/11 14:30	03/01/11 17:36	7439-92-1	
Nickel	**91.0**	ug/L	5.0	1.7	1	02/28/11 14:30	03/01/11 17:36	7440-02-0	
Selenium	ND	ug/L	10.0	3.8	1	02/28/11 14:30	03/01/11 17:36	7782-49-2	
Silver	**0.67J**	ug/L	5.0	0.10	1	02/28/11 14:30	03/01/11 17:36	7440-22-4	
Vanadium	**8.7**	ug/L	5.0	0.20	1	02/28/11 14:30	03/01/11 17:36	7440-62-2	
Zinc	**11.4**	ug/L	10.0	0.40	1	02/28/11 14:30	03/01/11 17:36	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020								
Thallium	ND	ug/L	0.50	0.25	5	02/24/11 10:49	02/26/11 03:18	7440-28-0	D3
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.38**	ug/L	0.20	0.10	1	03/02/11 15:00	03/03/11 13:32	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	**32.7**	ug/L	25.0	2.2	1		02/27/11 21:40	67-64-1	
Acrylonitrile	ND	ug/L	10.0	1.9	1		02/27/11 21:40	107-13-1	
Benzene	**2.0**	ug/L	1.0	0.25	1		02/27/11 21:40	71-43-2	
Bromochloromethane	ND	ug/L	1.0	0.17	1		02/27/11 21:40	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		02/27/11 21:40	75-27-4	
Bromoform	ND	ug/L	1.0	0.26	1		02/27/11 21:40	75-25-2	
Bromomethane	ND	ug/L	2.0	0.29	1		02/27/11 21:40	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	0.96	1		02/27/11 21:40	78-93-3	
Carbon disulfide	ND	ug/L	2.0	1.2	1		02/27/11 21:40	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		02/27/11 21:40	56-23-5	
Chlorobenzene	**1.8**	ug/L	1.0	0.23	1		02/27/11 21:40	108-90-7	
Chloroethane	ND	ug/L	1.0	0.54	1		02/27/11 21:40	75-00-3	
Chloroform	ND	ug/L	1.0	0.14	1		02/27/11 21:40	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		02/27/11 21:40	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	5.0	2.5	1		02/27/11 21:40	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.21	1		02/27/11 21:40	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		02/27/11 21:40	106-93-4	
Dibromomethane	ND	ug/L	1.0	0.21	1		02/27/11 21:40	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.30	1		02/27/11 21:40	95-50-1	
1,4-Dichlorobenzene	**6.9**	ug/L	1.0	0.33	1		02/27/11 21:40	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	1.0	1.0	1		02/27/11 21:40	110-57-6	
1,1-Dichloroethane	ND	ug/L	1.0	0.32	1		02/27/11 21:40	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		02/27/11 21:40	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.56	1		02/27/11 21:40	75-35-4	

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ANALYTICAL RESULTS

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

Sample: EW-4 **Lab ID: 9288220001** Collected: 02/21/11 10:20 Received: 02/21/11 14:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
cis-1,2-Dichloroethene	**2.3**	ug/L	1.0	0.19	1		02/27/11 21:40	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.49	1		02/27/11 21:40	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		02/27/11 21:40	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		02/27/11 21:40	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		02/27/11 21:40	10061-02-6	
Ethylbenzene	**22.5**	ug/L	1.0	0.30	1		02/27/11 21:40	100-41-4	
2-Hexanone	ND	ug/L	5.0	0.46	1		02/27/11 21:40	591-78-6	
Iodomethane	ND	ug/L	5.0	0.32	1		02/27/11 21:40	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		02/27/11 21:40	75-09-2	
4-Methyl-2-pentanone (MIBK)	**6.0**	ug/L	5.0	0.33	1		02/27/11 21:40	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		02/27/11 21:40	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.33	1		02/27/11 21:40	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.40	1		02/27/11 21:40	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		02/27/11 21:40	127-18-4	
Toluene	**2.2**	ug/L	1.0	0.26	1		02/27/11 21:40	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		02/27/11 21:40	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		02/27/11 21:40	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		02/27/11 21:40	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		02/27/11 21:40	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		02/27/11 21:40	96-18-4	
Vinyl acetate	ND	ug/L	2.0	0.35	1		02/27/11 21:40	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		02/27/11 21:40	75-01-4	
Xylene (Total)	**24.1**	ug/L	2.0	0.66	1		02/27/11 21:40	1330-20-7	
m&p-Xylene	**10.7**	ug/L	2.0	0.66	1		02/27/11 21:40	179601-23-1	
o-Xylene	**13.4**	ug/L	1.0	0.23	1		02/27/11 21:40	95-47-6	
4-Bromofluorobenzene (S)	100	%	70-130		1		02/27/11 21:40	460-00-4	
Dibromofluoromethane (S)	115	%	70-130		1		02/27/11 21:40	1868-53-7	
1,2-Dichloroethane-d4 (S)	115	%	70-130		1		02/27/11 21:40	17060-07-0	
Toluene-d8 (S)	101	%	70-130		1		02/27/11 21:40	2037-26-5	

ANALYTICAL RESULTS

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

Sample: EW-9 **Lab ID: 9288220002** Collected: 02/21/11 12:00 Received: 02/21/11 14:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Antimony	ND	ug/L	5.0	2.6	1	02/28/11 14:30	03/01/11 17:48	7440-36-0	
Arsenic	**11.3**	ug/L	5.0	2.7	1	02/28/11 14:30	03/01/11 17:48	7440-38-2	
Barium	**403**	ug/L	5.0	0.20	1	02/28/11 14:30	03/01/11 17:48	7440-39-3	
Beryllium	ND	ug/L	1.0	0.10	1	02/28/11 14:30	03/01/11 17:48	7440-41-7	
Cadmium	ND	ug/L	1.0	0.50	1	02/28/11 14:30	03/01/11 17:48	7440-43-9	
Chromium	**14.1**	ug/L	5.0	0.40	1	02/28/11 14:30	03/01/11 17:48	7440-47-3	
Cobalt	**18.6**	ug/L	5.0	0.60	1	02/28/11 14:30	03/01/11 17:48	7440-48-4	
Copper	**4.2J**	ug/L	5.0	0.30	1	02/28/11 14:30	03/01/11 17:48	7440-50-8	
Lead	ND	ug/L	5.0	4.0	1	02/28/11 14:30	03/01/11 17:48	7439-92-1	
Nickel	**63.8**	ug/L	5.0	1.7	1	02/28/11 14:30	03/01/11 17:48	7440-02-0	
Selenium	ND	ug/L	10.0	3.8	1	02/28/11 14:30	03/01/11 17:48	7782-49-2	
Silver	**1.2J**	ug/L	5.0	0.10	1	02/28/11 14:30	03/01/11 17:48	7440-22-4	
Vanadium	**6.5**	ug/L	5.0	0.20	1	02/28/11 14:30	03/01/11 17:48	7440-62-2	
Zinc	**14.9**	ug/L	10.0	0.40	1	02/28/11 14:30	03/01/11 17:48	7440-66-6	
6020 MET ICPMS	Analytical Method: EPA 6020								
Thallium	ND	ug/L	0.50	0.25	5	02/24/11 10:49	02/26/11 03:22	7440-28-0	D3
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	03/02/11 15:00	03/03/11 13:34	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	**42.3**	ug/L	25.0	2.2	1		02/27/11 22:05	67-64-1	
Acrylonitrile	ND	ug/L	10.0	1.9	1		02/27/11 22:05	107-13-1	
Benzene	**1.6**	ug/L	1.0	0.25	1		02/27/11 22:05	71-43-2	
Bromochloromethane	ND	ug/L	1.0	0.17	1		02/27/11 22:05	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		02/27/11 22:05	75-27-4	
Bromoform	ND	ug/L	1.0	0.26	1		02/27/11 22:05	75-25-2	
Bromomethane	ND	ug/L	2.0	0.29	1		02/27/11 22:05	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	0.96	1		02/27/11 22:05	78-93-3	
Carbon disulfide	ND	ug/L	2.0	1.2	1		02/27/11 22:05	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		02/27/11 22:05	56-23-5	
Chlorobenzene	**3.2**	ug/L	1.0	0.23	1		02/27/11 22:05	108-90-7	
Chloroethane	ND	ug/L	1.0	0.54	1		02/27/11 22:05	75-00-3	
Chloroform	ND	ug/L	1.0	0.14	1		02/27/11 22:05	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		02/27/11 22:05	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	5.0	2.5	1		02/27/11 22:05	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.21	1		02/27/11 22:05	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		02/27/11 22:05	106-93-4	
Dibromomethane	ND	ug/L	1.0	0.21	1		02/27/11 22:05	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.30	1		02/27/11 22:05	95-50-1	
1,4-Dichlorobenzene	**11.5**	ug/L	1.0	0.33	1		02/27/11 22:05	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	1.0	1.0	1		02/27/11 22:05	110-57-6	
1,1-Dichloroethane	ND	ug/L	1.0	0.32	1		02/27/11 22:05	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		02/27/11 22:05	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.56	1		02/27/11 22:05	75-35-4	

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ANALYTICAL RESULTS

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

Sample: EW-9 | **Lab ID: 9288220002** | Collected: 02/21/11 12:00 | Received: 02/21/11 14:15 | Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
cis-1,2-Dichloroethene	**2.6**	ug/L	1.0	0.19	1		02/27/11 22:05	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.49	1		02/27/11 22:05	156-60-5	
1,2-Dichloropropane	**0.27J**	ug/L	1.0	0.27	1		02/27/11 22:05	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		02/27/11 22:05	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		02/27/11 22:05	10061-02-6	
Ethylbenzene	**31.9**	ug/L	1.0	0.30	1		02/27/11 22:05	100-41-4	
2-Hexanone	ND	ug/L	5.0	0.46	1		02/27/11 22:05	591-78-6	
Iodomethane	ND	ug/L	5.0	0.32	1		02/27/11 22:05	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		02/27/11 22:05	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	0.33	1		02/27/11 22:05	108-10-1	
Styrene	**1.8**	ug/L	1.0	0.26	1		02/27/11 22:05	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.33	1		02/27/11 22:05	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.40	1		02/27/11 22:05	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		02/27/11 22:05	127-18-4	
Toluene	**1.5**	ug/L	1.0	0.26	1		02/27/11 22:05	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		02/27/11 22:05	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		02/27/11 22:05	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		02/27/11 22:05	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		02/27/11 22:05	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		02/27/11 22:05	96-18-4	
Vinyl acetate	ND	ug/L	2.0	0.35	1		02/27/11 22:05	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		02/27/11 22:05	75-01-4	
Xylene (Total)	**8.0**	ug/L	2.0	0.66	1		02/27/11 22:05	1330-20-7	
m&p-Xylene	**2.7**	ug/L	2.0	0.66	1		02/27/11 22:05	179601-23-1	
o-Xylene	**5.4**	ug/L	1.0	0.23	1		02/27/11 22:05	95-47-6	
4-Bromofluorobenzene (S)	100	%	70-130		1		02/27/11 22:05	460-00-4	
Dibromofluoromethane (S)	117	%	70-130		1		02/27/11 22:05	1868-53-7	
1,2-Dichloroethane-d4 (S)	113	%	70-130		1		02/27/11 22:05	17060-07-0	
Toluene-d8 (S)	103	%	70-130		1		02/27/11 22:05	2037-26-5	

ANALYTICAL RESULTS

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

Sample: TRIP BLANK **Lab ID: 9288220003** Collected: 02/21/11 00:00 Received: 02/21/11 14:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	**19.1J**	ug/L	25.0	2.2	1		03/03/11 04:29	67-64-1	
Acrylonitrile	ND	ug/L	10.0	1.9	1		03/03/11 04:29	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		03/03/11 04:29	71-43-2	
Bromochloromethane	ND	ug/L	1.0	0.17	1		03/03/11 04:29	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		03/03/11 04:29	75-27-4	
Bromoform	ND	ug/L	1.0	0.26	1		03/03/11 04:29	75-25-2	
Bromomethane	ND	ug/L	2.0	0.29	1		03/03/11 04:29	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	0.96	1		03/03/11 04:29	78-93-3	
Carbon disulfide	ND	ug/L	2.0	1.2	1		03/03/11 04:29	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		03/03/11 04:29	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		03/03/11 04:29	108-90-7	
Chloroethane	ND	ug/L	1.0	0.54	1		03/03/11 04:29	75-00-3	
Chloroform	ND	ug/L	1.0	0.14	1		03/03/11 04:29	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		03/03/11 04:29	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	5.0	2.5	1		03/03/11 04:29	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.21	1		03/03/11 04:29	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		03/03/11 04:29	106-93-4	
Dibromomethane	ND	ug/L	1.0	0.21	1		03/03/11 04:29	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.30	1		03/03/11 04:29	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		03/03/11 04:29	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	1.0	1.0	1		03/03/11 04:29	110-57-6	
1,1-Dichloroethane	ND	ug/L	1.0	0.32	1		03/03/11 04:29	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		03/03/11 04:29	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.56	1		03/03/11 04:29	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.19	1		03/03/11 04:29	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.49	1		03/03/11 04:29	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		03/03/11 04:29	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		03/03/11 04:29	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		03/03/11 04:29	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		03/03/11 04:29	100-41-4	
2-Hexanone	ND	ug/L	5.0	0.46	1		03/03/11 04:29	591-78-6	
Iodomethane	ND	ug/L	5.0	0.32	1		03/03/11 04:29	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		03/03/11 04:29	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	0.33	1		03/03/11 04:29	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		03/03/11 04:29	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.33	1		03/03/11 04:29	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.40	1		03/03/11 04:29	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		03/03/11 04:29	127-18-4	
Toluene	ND	ug/L	1.0	0.26	1		03/03/11 04:29	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		03/03/11 04:29	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		03/03/11 04:29	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		03/03/11 04:29	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		03/03/11 04:29	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		03/03/11 04:29	96-18-4	
Vinyl acetate	ND	ug/L	2.0	0.35	1		03/03/11 04:29	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		03/03/11 04:29	75-01-4	

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ANALYTICAL RESULTS

Project: JACKSON COUNTY 02/21

Pace Project No.: 9288220

Sample: TRIP BLANK **Lab ID: 9288220003** Collected: 02/21/11 00:00 Received: 02/21/11 14:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Xylene (Total)	ND	ug/L	2.0	0.66	1		03/03/11 04:29	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		03/03/11 04:29	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		03/03/11 04:29	95-47-6	
4-Bromofluorobenzene (S)	97	%	70-130		1		03/03/11 04:29	460-00-4	
Dibromofluoromethane (S)	101	%	70-130		1		03/03/11 04:29	1868-53-7	
1,2-Dichloroethane-d4 (S)	101	%	70-130		1		03/03/11 04:29	17060-07-0	
Toluene-d8 (S)	100	%	70-130		1		03/03/11 04:29	2037-26-5	

QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

QC Batch: MPRP/7933 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET NC Groundwater
Associated Lab Samples: 9288220001, 9288220002

METHOD BLANK: 570688 | Matrix: Water
Associated Lab Samples: 9288220001, 9288220002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	03/01/11 16:27	
Arsenic	ug/L	ND	5.0	03/01/11 16:27	
Barium	ug/L	ND	5.0	03/01/11 16:27	
Beryllium	ug/L	ND	1.0	03/01/11 16:27	
Cadmium	ug/L	ND	1.0	03/01/11 16:27	
Chromium	ug/L	ND	5.0	03/01/11 16:27	
Cobalt	ug/L	2.4J	5.0	03/01/11 16:27	
Copper	ug/L	0.54J	5.0	03/01/11 16:27	
Lead	ug/L	ND	5.0	03/01/11 16:27	
Nickel	ug/L	ND	5.0	03/01/11 16:27	
Selenium	ug/L	ND	10.0	03/01/11 16:27	
Silver	ug/L	ND	5.0	03/01/11 16:27	
Vanadium	ug/L	ND	5.0	03/01/11 16:27	
Zinc	ug/L	2.9J	10.0	03/01/11 16:27	

LABORATORY CONTROL SAMPLE: 570689

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	479	96	80-120	
Arsenic	ug/L	500	479	96	80-120	
Barium	ug/L	500	500	100	80-120	
Beryllium	ug/L	500	507	101	80-120	
Cadmium	ug/L	500	486	97	80-120	
Chromium	ug/L	500	485	97	80-120	
Cobalt	ug/L	500	500	100	80-120	
Copper	ug/L	500	501	100	80-120	
Lead	ug/L	500	486	97	80-120	
Nickel	ug/L	500	489	98	80-120	
Selenium	ug/L	500	475	95	80-120	
Silver	ug/L	250	238	95	80-120	
Vanadium	ug/L	500	500	100	80-120	
Zinc	ug/L	500	495	99	80-120	

MATRIX SPIKE SAMPLE: 570690

Parameter	Units	9288076001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	4.2J	500	435	86	75-125	
Arsenic	ug/L	ND	500	448	90	75-125	
Barium	ug/L	233	500	673	88	75-125	
Beryllium	ug/L	0.78J	500	462	92	75-125	

QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21

Pace Project No.: 9288220

MATRIX SPIKE SAMPLE: 570690

Parameter	Units	9288076001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cadmium	ug/L	ND	500	434	87	75-125	
Chromium	ug/L	36.5	500	478	88	75-125	
Cobalt	ug/L	19.4	500	455	87	75-125	
Copper	ug/L	20.8	500	489	94	75-125	
Lead	ug/L	ND	500	419	83	75-125	
Nickel	ug/L	26.7J	500	468	88	75-125	
Selenium	ug/L	3.8J	500	443	88	75-125	
Silver	ug/L	ND	250	218	87	75-125	
Vanadium	ug/L	56.9	500	510	91	75-125	
Zinc	ug/L	37.1	500	479	88	75-125	

SAMPLE DUPLICATE: 570691

Parameter	Units	9288076002 Result	Dup Result	RPD	Max RPD	Qualifiers
Antimony	ug/L	ND	ND		25	
Arsenic	ug/L	ND	ND		25	
Barium	ug/L	75.3J	74.7	1	25	
Beryllium	ug/L	ND	ND		25	
Cadmium	ug/L	ND	ND		25	
Chromium	ug/L	0.87J	0.99J		25	
Cobalt	ug/L	46.7	48.3	3	25	
Copper	ug/L	ND	ND		25	
Lead	ug/L	ND	ND		25	
Nickel	ug/L	6.0J	5.6	7	25	
Selenium	ug/L	ND	ND		25	
Silver	ug/L	ND	0.11J		25	
Vanadium	ug/L	2.4J	2.4J		25	
Zinc	ug/L	104	105	1	25	

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QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

QC Batch: ICPM/24849
QC Batch Method: EPA 6020
Analysis Method: EPA 6020
Analysis Description: 6020 MET
Associated Lab Samples: 9288220001, 9288220002

METHOD BLANK: 935115 Matrix: Water
Associated Lab Samples: 9288220001, 9288220002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Thallium	ug/L	ND	0.10	02/26/11 01:26	

LABORATORY CONTROL SAMPLE: 935116

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Thallium	ug/L	80	80.5	101	80-120	

MATRIX SPIKE SAMPLE: 935119

Parameter	Units	6093968008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Thallium	ug/L	ND	80	84.0	105	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 935215 935216

Parameter	Units	6093968001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Thallium	ug/L	ND	80	80	82.6	85.0	103	106	75-125	3	20	

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QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

QC Batch: MERP/3316 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 9288220001, 9288220002

METHOD BLANK: 571854 Matrix: Water
Associated Lab Samples: 9288220001, 9288220002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	03/03/11 12:18	

LABORATORY CONTROL SAMPLE: 571855

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.7	110	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 571856 571857

Parameter	Units	9287753015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	0.14J	2.5	2.5	2.4	2.4	90	92	75-125	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 571858 571859

Parameter	Units	9287753016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.8	2.6	112	103	75-125	9	25	

QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

QC Batch: MSV/14203 — Analysis Method: EPA 8260
QC Batch Method: EPA 8260 — Analysis Description: 8260 MSV Low Level Landfill
Associated Lab Samples: 9288220001, 9288220002

METHOD BLANK: 570437 — Matrix: Water
Associated Lab Samples: 9288220001, 9288220002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	02/27/11 21:15	
1,1,1-Trichloroethane	ug/L	ND	1.0	02/27/11 21:15	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	02/27/11 21:15	
1,1,2-Trichloroethane	ug/L	ND	1.0	02/27/11 21:15	
1,1-Dichloroethane	ug/L	ND	1.0	02/27/11 21:15	
1,1-Dichloroethene	ug/L	ND	1.0	02/27/11 21:15	
1,2,3-Trichloropropane	ug/L	ND	1.0	02/27/11 21:15	
1,2-Dibromo-3-chloropropane	ug/L	ND	5.0	02/27/11 21:15	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	02/27/11 21:15	
1,2-Dichlorobenzene	ug/L	ND	1.0	02/27/11 21:15	
1,2-Dichloroethane	ug/L	ND	1.0	02/27/11 21:15	
1,2-Dichloropropane	ug/L	ND	1.0	02/27/11 21:15	
1,4-Dichlorobenzene	ug/L	ND	1.0	02/27/11 21:15	
2-Butanone (MEK)	ug/L	ND	5.0	02/27/11 21:15	
2-Hexanone	ug/L	ND	5.0	02/27/11 21:15	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	5.0	02/27/11 21:15	
Acetone	ug/L	ND	25.0	02/27/11 21:15	
Acrylonitrile	ug/L	ND	10.0	02/27/11 21:15	
Benzene	ug/L	ND	1.0	02/27/11 21:15	
Bromochloromethane	ug/L	ND	1.0	02/27/11 21:15	
Bromodichloromethane	ug/L	ND	1.0	02/27/11 21:15	
Bromoform	ug/L	ND	1.0	02/27/11 21:15	
Bromomethane	ug/L	ND	2.0	02/27/11 21:15	
Carbon disulfide	ug/L	ND	2.0	02/27/11 21:15	
Carbon tetrachloride	ug/L	ND	1.0	02/27/11 21:15	
Chlorobenzene	ug/L	ND	1.0	02/27/11 21:15	
Chloroethane	ug/L	ND	1.0	02/27/11 21:15	
Chloroform	ug/L	ND	1.0	02/27/11 21:15	
Chloromethane	ug/L	ND	1.0	02/27/11 21:15	
cis-1,2-Dichloroethene	ug/L	ND	1.0	02/27/11 21:15	
cis-1,3-Dichloropropene	ug/L	ND	1.0	02/27/11 21:15	
Dibromochloromethane	ug/L	ND	1.0	02/27/11 21:15	
Dibromomethane	ug/L	ND	1.0	02/27/11 21:15	
Ethylbenzene	ug/L	ND	1.0	02/27/11 21:15	
Iodomethane	ug/L	ND	5.0	02/27/11 21:15	
m&p-Xylene	ug/L	ND	2.0	02/27/11 21:15	
Methylene Chloride	ug/L	ND	1.0	02/27/11 21:15	
o-Xylene	ug/L	ND	1.0	02/27/11 21:15	
Styrene	ug/L	ND	1.0	02/27/11 21:15	
Tetrachloroethene	ug/L	ND	1.0	02/27/11 21:15	
Toluene	ug/L	ND	1.0	02/27/11 21:15	
trans-1,2-Dichloroethene	ug/L	ND	1.0	02/27/11 21:15	
trans-1,3-Dichloropropene	ug/L	ND	1.0	02/27/11 21:15	

QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

METHOD BLANK: 570437 Matrix: Water

Associated Lab Samples: 9288220001, 9288220002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
trans-1,4-Dichloro-2-butene	ug/L	ND	1.0	02/27/11 21:15	
Trichloroethene	ug/L	ND	1.0	02/27/11 21:15	
Trichlorofluoromethane	ug/L	ND	1.0	02/27/11 21:15	
Vinyl acetate	ug/L	ND	2.0	02/27/11 21:15	
Vinyl chloride	ug/L	ND	1.0	02/27/11 21:15	
Xylene (Total)	ug/L	ND	2.0	02/27/11 21:15	
1,2-Dichloroethane-d4 (S)	%	117	70-130	02/27/11 21:15	
4-Bromofluorobenzene (S)	%	98	70-130	02/27/11 21:15	
Dibromofluoromethane (S)	%	120	70-130	02/27/11 21:15	
Toluene-d8 (S)	%	96	70-130	02/27/11 21:15	

LABORATORY CONTROL SAMPLE: 570438

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	54.6	109	70-130	
1,1,1-Trichloroethane	ug/L	50	52.0	104	70-130	
1,1,2,2-Tetrachloroethane	ug/L	50	54.5	109	70-130	
1,1,2-Trichloroethane	ug/L	50	57.9	116	70-130	
1,1-Dichloroethane	ug/L	50	53.1	106	70-130	
1,1-Dichloroethene	ug/L	50	53.4	107	70-132	
1,2,3-Trichloropropane	ug/L	50	51.8	104	70-130	
1,2-Dibromo-3-chloropropane	ug/L	50	55.2	110	70-130	
1,2-Dibromoethane (EDB)	ug/L	50	56.0	112	70-130	
1,2-Dichlorobenzene	ug/L	50	56.3	113	70-130	
1,2-Dichloroethane	ug/L	50	50.9	102	70-130	
1,2-Dichloropropane	ug/L	50	53.9	108	70-130	
1,4-Dichlorobenzene	ug/L	50	52.3	105	70-130	
2-Butanone (MEK)	ug/L	100	111	111	70-145	
2-Hexanone	ug/L	100	105	105	70-144	
4-Methyl-2-pentanone (MIBK)	ug/L	100	108	108	70-140	
Acetone	ug/L	100	107	107	50-175	
Acrylonitrile	ug/L	250	273	109	70-143	
Benzene	ug/L	50	53.0	106	70-130	
Bromochloromethane	ug/L	50	52.9	106	70-130	
Bromodichloromethane	ug/L	50	54.7	109	70-130	
Bromoform	ug/L	50	57.4	115	70-130	
Bromomethane	ug/L	50	62.7	125	54-130	
Carbon disulfide	ug/L	50	48.9	98	70-131	
Carbon tetrachloride	ug/L	50	52.8	106	70-132	
Chlorobenzene	ug/L	50	52.6	105	70-130	
Chloroethane	ug/L	50	54.2	108	64-134	
Chloroform	ug/L	50	56.7	113	70-130	
Chloromethane	ug/L	50	52.8	106	64-130	
cis-1,2-Dichloroethene	ug/L	50	51.3	103	70-131	
cis-1,3-Dichloropropene	ug/L	50	50.5	101	70-130	

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QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

LABORATORY CONTROL SAMPLE: 570438

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Dibromochloromethane	ug/L	50	55.7	111	70-130	
Dibromomethane	ug/L	50	54.2	108	70-131	
Ethylbenzene	ug/L	50	56.1	112	70-130	
Iodomethane	ug/L	100	121	121	49-180	
m&p-Xylene	ug/L	100	118	118	70-130	
Methylene Chloride	ug/L	50	57.2	114	63-130	
o-Xylene	ug/L	50	55.9	112	70-130	
Styrene	ug/L	50	55.3	111	70-130	
Tetrachloroethene	ug/L	50	53.8	108	70-130	
Toluene	ug/L	50	54.3	109	70-130	
trans-1,2-Dichloroethene	ug/L	50	50.5	101	70-130	
trans-1,3-Dichloropropene	ug/L	50	51.2	102	70-132	
trans-1,4-Dichloro-2-butene	ug/L	50	51.1	102	70-141	
Trichloroethene	ug/L	50	55.6	111	70-130	
Trichlorofluoromethane	ug/L	50	61.3	123	62-133	
Vinyl acetate	ug/L	100	105	105	66-157	
Vinyl chloride	ug/L	50	55.6	111	69-130	
Xylene (Total)	ug/L	150	174	116	70-130	
1,2-Dichloroethane-d4 (S)	%			95	70-130	
4-Bromofluorobenzene (S)	%			99	70-130	
Dibromofluoromethane (S)	%			95	70-130	
Toluene-d8 (S)	%			102	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 570439 570440

Parameter	Units	9288391010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethene	ug/L	ND	50	50	53.8	56.0	108	112	70-166	4	30	
Benzene	ug/L	0.42J	50	50	56.2	55.4	111	110	70-148	1	30	
Chlorobenzene	ug/L	ND	50	50	53.8	54.7	107	109	70-146	2	30	
Toluene	ug/L	ND	50	50	53.1	53.1	106	106	70-155	0	30	
Trichloroethene	ug/L	ND	50	50	49.9	49.8	100	100	69-151	0	30	
1,2-Dichloroethane-d4 (S)	%						102	106	70-130			
4-Bromofluorobenzene (S)	%						93	94	70-130			
Dibromofluoromethane (S)	%						106	109	70-130			
Toluene-d8 (S)	%						93	91	70-130			

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QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

QC Batch: MSV/14268 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV Low Level Landfill
Associated Lab Samples: 9288220003

METHOD BLANK: 571818 | Matrix: Water
Associated Lab Samples: 9288220003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	03/03/11 04:05	
1,1,1-Trichloroethane	ug/L	ND	1.0	03/03/11 04:05	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	03/03/11 04:05	
1,1,2-Trichloroethane	ug/L	ND	1.0	03/03/11 04:05	
1,1-Dichloroethane	ug/L	ND	1.0	03/03/11 04:05	
1,1-Dichloroethene	ug/L	ND	1.0	03/03/11 04:05	
1,2,3-Trichloropropane	ug/L	ND	1.0	03/03/11 04:05	
1,2-Dibromo-3-chloropropane	ug/L	ND	5.0	03/03/11 04:05	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	03/03/11 04:05	
1,2-Dichlorobenzene	ug/L	ND	1.0	03/03/11 04:05	
1,2-Dichloroethane	ug/L	ND	1.0	03/03/11 04:05	
1,2-Dichloropropane	ug/L	ND	1.0	03/03/11 04:05	
1,4-Dichlorobenzene	ug/L	ND	1.0	03/03/11 04:05	
2-Butanone (MEK)	ug/L	ND	5.0	03/03/11 04:05	
2-Hexanone	ug/L	ND	5.0	03/03/11 04:05	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	5.0	03/03/11 04:05	
Acetone	ug/L	ND	25.0	03/03/11 04:05	
Acrylonitrile	ug/L	ND	10.0	03/03/11 04:05	
Benzene	ug/L	ND	1.0	03/03/11 04:05	
Bromochloromethane	ug/L	ND	1.0	03/03/11 04:05	
Bromodichloromethane	ug/L	ND	1.0	03/03/11 04:05	
Bromoform	ug/L	ND	1.0	03/03/11 04:05	
Bromomethane	ug/L	ND	2.0	03/03/11 04:05	
Carbon disulfide	ug/L	ND	2.0	03/03/11 04:05	
Carbon tetrachloride	ug/L	ND	1.0	03/03/11 04:05	
Chlorobenzene	ug/L	ND	1.0	03/03/11 04:05	
Chloroethane	ug/L	ND	1.0	03/03/11 04:05	
Chloroform	ug/L	ND	1.0	03/03/11 04:05	
Chloromethane	ug/L	ND	1.0	03/03/11 04:05	
cis-1,2-Dichloroethene	ug/L	ND	1.0	03/03/11 04:05	
cis-1,3-Dichloropropene	ug/L	ND	1.0	03/03/11 04:05	
Dibromochloromethane	ug/L	ND	1.0	03/03/11 04:05	
Dibromomethane	ug/L	ND	1.0	03/03/11 04:05	
Ethylbenzene	ug/L	ND	1.0	03/03/11 04:05	
Iodomethane	ug/L	ND	5.0	03/03/11 04:05	
m&p-Xylene	ug/L	ND	2.0	03/03/11 04:05	
Methylene Chloride	ug/L	ND	1.0	03/03/11 04:05	
o-Xylene	ug/L	ND	1.0	03/03/11 04:05	
Styrene	ug/L	ND	1.0	03/03/11 04:05	
Tetrachloroethene	ug/L	ND	1.0	03/03/11 04:05	
Toluene	ug/L	ND	1.0	03/03/11 04:05	
trans-1,2-Dichloroethene	ug/L	ND	1.0	03/03/11 04:05	
trans-1,3-Dichloropropene	ug/L	ND	1.0	03/03/11 04:05	

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QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

METHOD BLANK: 571818 Matrix: Water

Associated Lab Samples: 9288220003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
trans-1,4-Dichloro-2-butene	ug/L	ND	1.0	03/03/11 04:05	
Trichloroethene	ug/L	ND	1.0	03/03/11 04:05	
Trichlorofluoromethane	ug/L	ND	1.0	03/03/11 04:05	
Vinyl acetate	ug/L	ND	2.0	03/03/11 04:05	
Vinyl chloride	ug/L	ND	1.0	03/03/11 04:05	
Xylene (Total)	ug/L	ND	2.0	03/03/11 04:05	
1,2-Dichloroethane-d4 (S)	%	98	70-130	03/03/11 04:05	
4-Bromofluorobenzene (S)	%	96	70-130	03/03/11 04:05	
Dibromofluoromethane (S)	%	101	70-130	03/03/11 04:05	
Toluene-d8 (S)	%	99	70-130	03/03/11 04:05	

LABORATORY CONTROL SAMPLE: 571819

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	55.6	111	70-130	
1,1,1-Trichloroethane	ug/L	50	53.7	107	70-130	
1,1,2,2-Tetrachloroethane	ug/L	50	54.5	109	70-130	
1,1,2-Trichloroethane	ug/L	50	57.4	115	70-130	
1,1-Dichloroethane	ug/L	50	53.8	108	70-130	
1,1-Dichloroethene	ug/L	50	50.4	101	70-132	
1,2,3-Trichloropropane	ug/L	50	53.8	108	70-130	
1,2-Dibromo-3-chloropropane	ug/L	50	55.7	111	70-130	
1,2-Dibromoethane (EDB)	ug/L	50	52.7	105	70-130	
1,2-Dichlorobenzene	ug/L	50	54.8	110	70-130	
1,2-Dichloroethane	ug/L	50	52.2	104	70-130	
1,2-Dichloropropane	ug/L	50	57.1	114	70-130	
1,4-Dichlorobenzene	ug/L	50	53.4	107	70-130	
2-Butanone (MEK)	ug/L	100	103	103	70-145	
2-Hexanone	ug/L	100	107	107	70-144	
4-Methyl-2-pentanone (MIBK)	ug/L	100	113	113	70-140	
Acetone	ug/L	100	109	109	50-175	
Acrylonitrile	ug/L	250	271	109	70-143	
Benzene	ug/L	50	53.8	108	70-130	
Bromochloromethane	ug/L	50	54.0	108	70-130	
Bromodichloromethane	ug/L	50	52.7	105	70-130	
Bromoform	ug/L	50	51.0	102	70-130	
Bromomethane	ug/L	50	42.6	85	54-130	
Carbon disulfide	ug/L	50	46.0	92	70-131	
Carbon tetrachloride	ug/L	50	55.5	111	70-132	
Chlorobenzene	ug/L	50	53.6	107	70-130	
Chloroethane	ug/L	50	44.8	90	64-134	
Chloroform	ug/L	50	55.1	110	70-130	
Chloromethane	ug/L	50	35.9	72	64-130	
cis-1,2-Dichloroethene	ug/L	50	52.4	105	70-131	
cis-1,3-Dichloropropene	ug/L	50	54.2	108	70-130	

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205 East Meadow Road - Suite A
Eden, NC 27288
(336)623-8921

Pace Analytical Services, Inc.
2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

LABORATORY CONTROL SAMPLE: 571819

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Dibromochloromethane	ug/L	50	52.0	104	70-130	
Dibromomethane	ug/L	50	55.4	111	70-131	
Ethylbenzene	ug/L	50	53.6	107	70-130	
Iodomethane	ug/L	100	83.2	83	49-180	
m&p-Xylene	ug/L	100	109	109	70-130	
Methylene Chloride	ug/L	50	53.5	107	63-130	
o-Xylene	ug/L	50	55.2	110	70-130	
Styrene	ug/L	50	55.0	110	70-130	
Tetrachloroethene	ug/L	50	52.6	105	70-130	
Toluene	ug/L	50	53.3	107	70-130	
trans-1,2-Dichloroethene	ug/L	50	50.3	101	70-130	
trans-1,3-Dichloropropene	ug/L	50	54.8	110	70-132	
trans-1,4-Dichloro-2-butene	ug/L	50	45.7	91	70-141	
Trichloroethene	ug/L	50	55.2	110	70-130	
Trichlorofluoromethane	ug/L	50	47.5	95	62-133	
Vinyl acetate	ug/L	100	93.7	94	66-157	
Vinyl chloride	ug/L	50	47.0	94	69-130	
Xylene (Total)	ug/L	150	164	109	70-130	
1,2-Dichloroethane-d4 (S)	%			97	70-130	
4-Bromofluorobenzene (S)	%			101	70-130	
Dibromofluoromethane (S)	%			99	70-130	
Toluene-d8 (S)	%			101	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 571820 571821

Parameter	Units	9288654004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethene	ug/L	ND	50	50	54.3	54.8	109	110	70-166	1	30	
Benzene	ug/L	ND	50	50	55.8	56.5	112	113	70-148	1	30	
Chlorobenzene	ug/L	ND	50	50	55.1	56.2	110	112	70-146	2	30	
Toluene	ug/L	ND	50	50	56.0	56.6	112	113	70-155	1	30	
Trichloroethene	ug/L	ND	50	50	55.9	58.1	112	116	69-151	4	30	
1,2-Dichloroethane-d4 (S)	%						97	99	70-130			
4-Bromofluorobenzene (S)	%						96	98	70-130			
Dibromofluoromethane (S)	%						99	101	70-130			
Toluene-d8 (S)	%						97	99	70-130			

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Huntersville, NC 28078
(704)875-9092

QUALIFIERS

Project: JACKSON COUNTY 02/21
Pace Project No.: 9288220

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-A	Pace Analytical Services - Asheville
PASI-C	Pace Analytical Services - Charlotte
PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1332961

Section A — **Required** Client Information:

- Company: ALTAMONT ENVIRONMENTAL
- Address: 231 HAYWOOD ST, ASHEVILLE, NC 28801
- Email To: [illegible]
- Phone: 828 281-3350 Fax: 828 281-3351
- Requested Due Date/TAT: STANDARD

Section B — **Required** Project Information:

- Report To: CHRIS GILBERT
- Copy To: ——
- Purchase Order No.: ——
- Project Name: JACKSON COUNTY
- Project Number: 2040.3032

Section C — Invoice Information:

- Attention: SUE BREWER
- Company Name: ALTAMONT ENVIRONMENTAL, INC.
- Address: 231 HAYWOOD ST / ASHEVILLE
- Pace Quote Reference: ——
- Pace Project Manager: LORI PATTON
- Pace Profile #: ——

REGULATORY AGENCY

- ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
- ☐ UST ☐ RCRA ☒ OTHER MSW

Site Location STATE: NC

Section D — **Required** Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT

Collected: ~~COMPOSITE START~~ GRAB; ~~COMPOSITE END/GRAB~~

Requested Analysis Filtered (Y/N): APPENDIX I METALS — N; APPENDIX I VOCS — N

Pace Project No./Lab I.D.: 9288220

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	Collected Start DATE	Collected Start TIME	Collected End DATE	Collected End TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Appendix I Metals	Appendix I VOCs	Residual Chlorine (Y/N)	Pace Project No./Lab I.D.
1	EW-4			2/21/11	1020	—	—	-	4			X	X					X	X	N	9288220001
2	~~[illegible]~~ EW-9			2/21/11	1200	—	—	-	4			X	X					X	X	N	9288220002
3																					9288220003
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	[illegible] / ALTAMONT	2/21/11	1415	[illegible]	2/21/11	1425	5.3	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

- PRINT Name of SAMPLER: CHRIS GILBERT
- SIGNATURE of SAMPLER: [illegible]
- DATE Signed (MM/DD/YY): 02/21/2011

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Sample Condition Upon Receipt

Pace Analytical

Client Name: Altamont Project # 9288220

Where Received: ☐ Huntersville ☒ Asheville ☐ Eden

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace Other________

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☒ no

Optional
Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other________

Thermometer Used: (IR Gun#2 -80344039) **Type of Ice:** (Wet) Blue None ☒ Samples on ice, cooling process has begun

IR Gun #3- 101938608 Bio- 14-648-44

Temp Correction Factor: Add / (Subtract) 0.5 C

Corrected Cooler Temp.: 5.3 C **Biological Tissue is Frozen:** Yes No

Temp should be above freezing to 6°C **Comments:**

Date and Initials of person examining contents: 2/21/11

		Comments
Chain of Custody Present:	☒Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☒Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☒Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☒Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☒Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☒No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☒No ☐N/A	7.
Sufficient Volume:	☒Yes ☐No ☐N/A	8.
Correct Containers Used:	☒Yes ☐No ☐N/A	9.
-Pace Containers Used:	☒Yes ☐No ☐N/A	
Containers Intact:	☒Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☒Yes ☐No ☐N/A	11.
Sample Labels match COC:	☒Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: WT		
All containers needing preservation have been checked.	☒Yes ☐No ☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☒Yes ☐No ☐N/A	
exceptions: (VOA), coliform, TOC, O&G, WI-DRO (water)	☒Yes ☐No	Initial when completed
Samples checked for dechlorination:	☐Yes ☐No ☒N/A	14.
Headspace in VOA Vials (>6mm):	☒Yes ☐No ☐N/A	15.
Trip Blank Present:	☒Yes ☐No ☐N/A	16.
Trip Blank Custody Seals Present	☒Yes ☐No ☐N/A	
Pace Trip Blank Lot # (if purchased):________		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: ____________________ Date/Time: ____________

Comments/ Resolution: ____________________

SCURF Review: LP Date: 2/21/11 **SRF Review:** LP Date: 2/21/11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

APPENDIX B

Runoff Curve Number Supporting Documents

Jackson County, North Carolina

Ud—Udorthents, loamy

Map Unit Setting

Mean annual precipitation: 45 to 65 inches
Mean annual air temperature: 32 degrees F
Frost-free period: 0 days

Map Unit Composition

Udorthents, loamy, and similar soils: 85 percent

Description of Udorthents, Loamy

Setting

Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Loamy and clayey mine spoil or earthy fill derived from igneous, metamorphic and sedimentary rock

Properties and qualities

Slope: 0 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to very high (0.00 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.2 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 80 inches: Sandy clay loam

Data Source Information

Soil Survey Area: Jackson County, North Carolina
Survey Area Data: Version 7, Apr 17, 2009

Soil Group : C Sandy Clay Loam

Appendix A

Hydrologic Soil Groups

Soils are classified into hydrologic soil groups (HSG's) to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSG's, which are A, B, C, and D, are one element used in determining runoff curve numbers (see chapter 2). For the convenience of TR-55 users, exhibit A-1 lists the HSG classification of United States soils.

The infiltration rate is the rate at which water enters the soil at the soil surface. It is controlled by surface conditions. HSG also indicates the transmission rate—the rate at which the water moves within the soil. This rate is controlled by the soil profile. Approximate numerical ranges for transmission rates shown in the HSG definitions were first published by Musgrave (USDA 1955). The four groups are defined by SCS soil scientists as follows:

Group A soils have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sand or gravel and have a high rate of water transmission (greater than 0.30 in/hr).

Group B soils have moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (0.15-0.30 in/hr).

Group C soils have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (0.05-0.15 in/hr).

Group D soils have high runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very low rate of water transmission (0-0.05 in/hr).

In exhibit A-1, some of the listed soils have an added modifier; for example, "Abrazo, gravelly." This refers to a gravelly phase of the Abrazo series that is found in SCS soil map legends.

Disturbed soil profiles

As a result of urbanization, the soil profile may be considerably altered and the listed group classification may no longer apply. In these circumstances, use the following to determine HSG according to the texture of the new surface soil, provided that significant compaction has not occurred (Brakensiek and Rawls 1983).

HSG	*Soil textures*
A	Sand, loamy sand, or sandy loam
B	Silt loam or loam
C	Sandy clay loam
D	Clay loam, silty clay loam, sandy clay, silty clay, or clay

Drainage and group D soils

Some soils in the list are in group D because of a high water table that creates a drainage problem. Once these soils are effectively drained, they are placed in a different group. For example, Ackerman soil is classified as A/D. This indicates that the drained Ackerman soil is in group A and the undrained soil is in group D.

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]	77	86	91	94	
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

APPENDIX C

H.E.L.P. Output

```
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**               HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                 **
**                 DEVELOPED BY ENVIRONMENTAL LABORATORY                    **
**                   USAE WATERWAYS EXPERIMENT STATION                      **
**            FOR USEPA RISK REDUCTION ENGINEERING LABORATORY               **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:    C:\HELP3\DATA4.D4
TEMPERATURE DATA FILE:      C:\HELP3\DATA7.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\DATA13.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\DATA11.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\DATA10.D10
OUTPUT DATA FILE:           C:\HELP3\JACKLF.OUT


TIME:  11:34     DATE:   6/27/2011


******************************************************************************

     TITLE:  JCLF

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                   LAYER  1
                                   --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER  10
           THICKNESS                    =      6.00   INCHES
           POROSITY                     =      0.3980 VOL/VOL
           FIELD CAPACITY               =      0.2440 VOL/VOL
           WILTING POINT                =      0.1360 VOL/VOL
           INITIAL SOIL WATER CONTENT   =      0.2934 VOL/VOL
           EFFECTIVE SAT. HYD. COND.    =  0.119999997000E-03 CM/SEC
         NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
                  FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                   LAYER  2
                                   --------
```

```
           TYPE 1 - VERTICAL PERCOLATION LAYER
               MATERIAL TEXTURE NUMBER  10
THICKNESS                    =     18.00   INCHES
POROSITY                     =      0.3980 VOL/VOL
FIELD CAPACITY               =      0.2440 VOL/VOL
WILTING POINT                =      0.1360 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.3018 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.119999997000E-03 CM/SEC


                        LAYER  3
                        --------

           TYPE 1 - VERTICAL PERCOLATION LAYER
               MATERIAL TEXTURE NUMBER  18
THICKNESS                    =    120.00   INCHES
POROSITY                     =      0.6710 VOL/VOL
FIELD CAPACITY               =      0.2920 VOL/VOL
WILTING POINT                =      0.0770 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.2968 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC


                        LAYER  4
                        --------

           TYPE 1 - VERTICAL PERCOLATION LAYER
               MATERIAL TEXTURE NUMBER  18
THICKNESS                    =    240.00   INCHES
POROSITY                     =      0.6710 VOL/VOL
FIELD CAPACITY               =      0.2920 VOL/VOL
WILTING POINT                =      0.0770 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.3083 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC


                        LAYER  5
                        --------

           TYPE 1 - VERTICAL PERCOLATION LAYER
               MATERIAL TEXTURE NUMBER  18
THICKNESS                    =    240.00   INCHES
POROSITY                     =      0.6710 VOL/VOL
FIELD CAPACITY               =      0.2920 VOL/VOL
WILTING POINT                =      0.0770 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.2920 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC


                        LAYER  6
                        --------

           TYPE 1 - VERTICAL PERCOLATION LAYER
               MATERIAL TEXTURE NUMBER  18
```

```
THICKNESS                    =    240.00   INCHES
POROSITY                     =      0.6710 VOL/VOL
FIELD CAPACITY               =      0.2920 VOL/VOL
WILTING POINT                =      0.0770 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.2932 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
```

LAYER 7

```
          TYPE 1 - VERTICAL PERCOLATION LAYER
              MATERIAL TEXTURE NUMBER  18
THICKNESS                    =    240.00   INCHES
POROSITY                     =      0.6710 VOL/VOL
FIELD CAPACITY               =      0.2920 VOL/VOL
WILTING POINT                =      0.0770 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.2920 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
```

LAYER 8

```
              TYPE 3 - BARRIER SOIL LINER
              MATERIAL TEXTURE NUMBER   6
THICKNESS                    =     48.00   INCHES
POROSITY                     =      0.4530 VOL/VOL
FIELD CAPACITY               =      0.1900 VOL/VOL
WILTING POINT                =      0.0850 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.4530 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.720000011000E-03 CM/SEC
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GENERAL DESIGN AND EVAPORATIVE ZONE DATA

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NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM A USER-
         SPECIFIED CURVE NUMBER OF 74.0, A SURFACE SLOPE
         OF 55.% AND A SLOPE LENGTH OF  350. FEET.

SCS RUNOFF CURVE NUMBER            =     76.40
FRACTION OF AREA ALLOWING RUNOFF   =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE =      7.300  ACRES
EVAPORATIVE ZONE DEPTH             =     10.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE  =      3.117  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE =      3.980  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE =      1.360  INCHES
INITIAL SNOW WATER                 =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS   =    349.067  INCHES
TOTAL INITIAL WATER                =    349.067  INCHES
TOTAL SUBSURFACE INFLOW            =      0.00   INCHES/YEAR
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EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM ASHEVILLE NORTH CAROLINA

STATION LATITUDE	=	35.26 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	96
END OF GROWING SEASON (JULIAN DATE)	=	298
EVAPORATIVE ZONE DEPTH	=	10.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.60 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	71.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	75.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	84.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	77.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR ASHEVILLE NORTH CAROLINA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
3.48	3.60	5.13	3.84	4.19	4.20
4.43	4.79	3.96	3.29	3.29	3.51

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR ASHEVILLE NORTH CAROLINA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
36.80	39.10	46.40	55.70	63.30	69.80
73.20	72.60	66.90	56.00	46.40	39.30

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR ASHEVILLE NORTH CAROLINA AND STATION LATITUDE = 35.26 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.75	1238828.620	100.00
RUNOFF	0.080	2131.704	0.17
EVAPOTRANSPIRATION	31.034	822357.937	66.38
PERC./LEAKAGE THROUGH LAYER 8	15.635242	414318.281	33.44

AVG. HEAD ON TOP OF LAYER 8	0.0132		
CHANGE IN WATER STORAGE	0.001	21.026	0.00
SOIL WATER AT START OF YEAR	349.067	9249938.000	
SOIL WATER AT END OF YEAR	349.068	9249959.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.278	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.69	1396232.370	100.00
RUNOFF	0.919	24348.654	1.74
EVAPOTRANSPIRATION	23.589	625079.875	44.77
PERC./LEAKAGE THROUGH LAYER 8	18.153347	481045.562	34.45
AVG. HEAD ON TOP OF LAYER 8	0.0154		
CHANGE IN WATER STORAGE	10.029	265757.437	19.03
SOIL WATER AT START OF YEAR	349.068	9249959.000	
SOIL WATER AT END OF YEAR	359.097	9515717.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.859	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.62	1288381.870	100.00
RUNOFF	0.636	16857.422	1.31

EVAPOTRANSPIRATION	29.626	785051.562	60.93
PERC./LEAKAGE THROUGH LAYER 8	24.441761	647682.250	50.27
AVG. HEAD ON TOP OF LAYER 8	0.0204		
CHANGE IN WATER STORAGE	-6.084	-161208.187	-12.51
SOIL WATER AT START OF YEAR	359.097	9515717.000	
SOIL WATER AT END OF YEAR	353.014	9354509.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.162	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.42	1097588.620	100.00
RUNOFF	1.172	31062.635	2.83
EVAPOTRANSPIRATION	26.720	708064.125	64.51
PERC./LEAKAGE THROUGH LAYER 8	19.482325	516262.125	47.04
AVG. HEAD ON TOP OF LAYER 8	0.0166		
CHANGE IN WATER STORAGE	-5.955	-157801.187	-14.38
SOIL WATER AT START OF YEAR	353.014	9354509.000	
SOIL WATER AT END OF YEAR	347.059	9196708.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.960	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.64	1209414.500	100.00

RUNOFF	0.067	1786.502	0.15
EVAPOTRANSPIRATION	28.254	748691.750	61.91
PERC./LEAKAGE THROUGH LAYER 8	16.638376	440900.344	36.46
AVG. HEAD ON TOP OF LAYER 8	0.0140		
CHANGE IN WATER STORAGE	0.681	18034.490	1.49
SOIL WATER AT START OF YEAR	347.059	9196708.000	
SOIL WATER AT END OF YEAR	347.739	9214742.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0001	1.365	0.00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.72	1317530.120	100.00
RUNOFF	0.522	13826.372	1.05
EVAPOTRANSPIRATION	28.465	754299.187	57.25
PERC./LEAKAGE THROUGH LAYER 8	17.891989	474119.812	35.99
AVG. HEAD ON TOP OF LAYER 8	0.0151		
CHANGE IN WATER STORAGE	2.841	75285.367	5.71
SOIL WATER AT START OF YEAR	347.739	9214742.000	
SOIL WATER AT END OF YEAR	350.580	9290027.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.657	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.38	1388017.870	100.00
RUNOFF	1.215	32192.365	2.32
EVAPOTRANSPIRATION	31.871	844561.062	60.85
PERC./LEAKAGE THROUGH LAYER 8	19.982748	529522.875	38.15
AVG. HEAD ON TOP OF LAYER 8	0.0168		
CHANGE IN WATER STORAGE	-0.689	-18257.687	-1.32
SOIL WATER AT START OF YEAR	350.580	9290027.000	
SOIL WATER AT END OF YEAR	349.891	9271770.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.708	0.00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.99	1192189.870	100.00
RUNOFF	0.191	5072.251	0.43
EVAPOTRANSPIRATION	30.287	802569.750	67.32
PERC./LEAKAGE THROUGH LAYER 8	17.924078	474970.156	39.84
AVG. HEAD ON TOP OF LAYER 8	0.0150		
CHANGE IN WATER STORAGE	-3.412	-90421.531	-7.58
SOIL WATER AT START OF YEAR	349.891	9271770.000	
SOIL WATER AT END OF YEAR	346.479	9181348.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.809	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.55	1313025.620	100.00
RUNOFF	0.481	12746.112	0.97
EVAPOTRANSPIRATION	24.747	655766.125	49.94
PERC./LEAKAGE THROUGH LAYER 8	18.683430	495092.219	37.71
AVG. HEAD ON TOP OF LAYER 8	0.0159		
CHANGE IN WATER STORAGE	5.639	149420.672	11.38
SOIL WATER AT START OF YEAR	346.479	9181348.000	
SOIL WATER AT END OF YEAR	351.517	9314854.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.601	15914.817	1.21
ANNUAL WATER BUDGET BALANCE	0.0000	0.505	0.00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.04	1379008.250	100.00
RUNOFF	0.827	21906.545	1.59
EVAPOTRANSPIRATION	30.020	795509.875	57.69
PERC./LEAKAGE THROUGH LAYER 8	20.957521	555353.375	40.27
AVG. HEAD ON TOP OF LAYER 8	0.0182		
CHANGE IN WATER STORAGE	0.235	6238.129	0.45
SOIL WATER AT START OF YEAR	351.517	9314854.000	
SOIL WATER AT END OF YEAR	352.209	9333174.000	
SNOW WATER AT START OF YEAR	0.601	15914.817	1.15
SNOW WATER AT END OF YEAR	0.145	3832.990	0.28
ANNUAL WATER BUDGET BALANCE	0.0000	0.253	0.00

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ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.48	1019681.560	100.00
RUNOFF	0.127	3364.440	0.33
EVAPOTRANSPIRATION	26.526	702906.312	68.93
PERC./LEAKAGE THROUGH LAYER 8	20.743658	549686.187	53.91
AVG. HEAD ON TOP OF LAYER 8	0.0182		
CHANGE IN WATER STORAGE	-8.916	-236275.828	-23.17
SOIL WATER AT START OF YEAR	352.209	9333174.000	
SOIL WATER AT END OF YEAR	343.437	9100731.000	
SNOW WATER AT START OF YEAR	0.145	3832.990	0.38
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.404	0.00

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ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.14	1037170.870	100.00
RUNOFF	4.128	109385.961	10.55
EVAPOTRANSPIRATION	21.618	572862.500	55.23
PERC./LEAKAGE THROUGH LAYER 8	7.358813	195001.187	18.80
AVG. HEAD ON TOP OF LAYER 8	0.0061		
CHANGE IN WATER STORAGE	6.035	159921.562	15.42
SOIL WATER AT START OF YEAR	343.437	9100731.000	
SOIL WATER AT END OF YEAR	349.472	9260653.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.366	0.00

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ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.94	1296861.000	100.00
RUNOFF	0.203	5382.552	0.42
EVAPOTRANSPIRATION	29.880	791793.375	61.05
PERC./LEAKAGE THROUGH LAYER 8	15.041915	398595.719	30.74
AVG. HEAD ON TOP OF LAYER 8	0.0127		
CHANGE IN WATER STORAGE	3.815	101089.836	7.79
SOIL WATER AT START OF YEAR	349.472	9260653.000	
SOIL WATER AT END OF YEAR	349.723	9267315.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	3.563	94427.883	7.28
ANNUAL WATER BUDGET BALANCE	0.0000	-0.556	0.00

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ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.64	1076919.620	100.00
RUNOFF	0.578	15322.598	1.42
EVAPOTRANSPIRATION	24.265	643007.437	59.71
PERC./LEAKAGE THROUGH LAYER 8	18.603647	492978.062	45.78
AVG. HEAD ON TOP OF LAYER 8	0.0155		
CHANGE IN WATER STORAGE	-2.807	-74388.664	-6.91
SOIL WATER AT START OF YEAR	349.723	9267315.000	
SOIL WATER AT END OF YEAR	350.479	9287354.000	
SNOW WATER AT START OF YEAR	3.563	94427.883	8.77
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE	0.0000	0.101	0.00

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ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.42	991592.687	100.00
RUNOFF	0.258	6838.473	0.69
EVAPOTRANSPIRATION	26.697	707434.375	71.34
PERC./LEAKAGE THROUGH LAYER 8	15.652279	414769.750	41.83
AVG. HEAD ON TOP OF LAYER 8	0.0132		
CHANGE IN WATER STORAGE	-5.187	-137450.625	-13.86
SOIL WATER AT START OF YEAR	350.479	9287354.000	
SOIL WATER AT END OF YEAR	345.292	9149903.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.682	0.00

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ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.36	1360988.750	100.00
RUNOFF	0.622	16474.201	1.21
EVAPOTRANSPIRATION	29.359	777987.625	57.16
PERC./LEAKAGE THROUGH LAYER 8	15.473846	410041.469	30.13
AVG. HEAD ON TOP OF LAYER 8	0.0131		
CHANGE IN WATER STORAGE	5.905	156486.266	11.50
SOIL WATER AT START OF YEAR	345.292	9149903.000	
SOIL WATER AT END OF YEAR	351.198	9306390.000	

SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.783	0.00

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ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.72	1238033.000	100.00
RUNOFF	0.390	10345.384	0.84
EVAPOTRANSPIRATION	26.908	713034.562	57.59
PERC./LEAKAGE THROUGH LAYER 8	23.556847	624232.875	50.42
AVG. HEAD ON TOP OF LAYER 8	0.0205		
CHANGE IN WATER STORAGE	-4.135	-109579.281	-8.85
SOIL WATER AT START OF YEAR	351.198	9306390.000	
SOIL WATER AT END OF YEAR	347.063	9196810.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.505	0.00

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ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
PRECIPITATION	55.53	1471489.120	100.00
RUNOFF	1.354	35870.527	2.44
EVAPOTRANSPIRATION	30.044	796142.250	54.10
PERC./LEAKAGE THROUGH LAYER 8	16.316406	432368.469	29.38
AVG. HEAD ON TOP OF LAYER 8	0.0139		
CHANGE IN WATER STORAGE	7.816	207108.344	14.07
SOIL WATER AT START OF YEAR	347.063	9196810.000	

SOIL WATER AT END OF YEAR	354.878	9403919.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.455	0.00

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ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	1301631.120	100.00
RUNOFF	0.231	6124.893	0.47
EVAPOTRANSPIRATION	29.999	794950.562	61.07
PERC./LEAKAGE THROUGH LAYER 8	21.996162	582876.312	44.78
AVG. HEAD ON TOP OF LAYER 8	0.0187		
CHANGE IN WATER STORAGE	-3.107	-82320.930	-6.32
SOIL WATER AT START OF YEAR	354.878	9403919.000	
SOIL WATER AT END OF YEAR	351.772	9321598.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.253	0.00

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ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.76	1212594.000	100.00
RUNOFF	0.027	722.471	0.06
EVAPOTRANSPIRATION	31.925	845977.250	69.77
PERC./LEAKAGE THROUGH LAYER 8	21.312807	564768.062	46.58
AVG. HEAD ON TOP OF LAYER 8	0.0178		

CHANGE IN WATER STORAGE	-7.505	-198874.312	-16.40
SOIL WATER AT START OF YEAR	351.772	9321598.000	
SOIL WATER AT END OF YEAR	344.267	9122723.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.556	0.00

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ANNUAL TOTALS FOR YEAR 21

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.48	1364168.370	100.00
RUNOFF	0.290	7684.031	0.56
EVAPOTRANSPIRATION	27.676	733379.562	53.76
PERC./LEAKAGE THROUGH LAYER 8	14.201995	376338.687	27.59
AVG. HEAD ON TOP OF LAYER 8	0.0121		
CHANGE IN WATER STORAGE	9.312	246766.281	18.09
SOIL WATER AT START OF YEAR	344.267	9122723.000	
SOIL WATER AT END OF YEAR	353.579	9369490.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.227	0.00

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ANNUAL TOTALS FOR YEAR 22

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.23	1225048.870	100.00
RUNOFF	0.293	7756.862	0.63
EVAPOTRANSPIRATION	27.417	726512.625	59.30
PERC./LEAKAGE THROUGH LAYER 8	20.315662	538344.750	43.94

AVG. HEAD ON TOP OF LAYER 8	0.0171		
CHANGE IN WATER STORAGE	-1.795	-47565.254	-3.88
SOIL WATER AT START OF YEAR	353.579	9369490.000	
SOIL WATER AT END OF YEAR	351.784	9321924.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.101	0.00

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ANNUAL TOTALS FOR YEAR 23

	INCHES	CU. FEET	PERCENT
PRECIPITATION	55.35	1466719.500	100.00
RUNOFF	0.296	7853.706	0.54
EVAPOTRANSPIRATION	30.961	820436.437	55.94
PERC./LEAKAGE THROUGH LAYER 8	22.297529	590862.250	40.28
AVG. HEAD ON TOP OF LAYER 8	0.0191		
CHANGE IN WATER STORAGE	1.795	47567.680	3.24
SOIL WATER AT START OF YEAR	351.784	9321924.000	
SOIL WATER AT END OF YEAR	353.579	9369492.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.657	0.00

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ANNUAL TOTALS FOR YEAR 24

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.86	1162246.120	100.00
RUNOFF	0.171	4526.632	0.39

EVAPOTRANSPIRATION	26.893	712628.062	61.31
PERC./LEAKAGE THROUGH LAYER 8	23.381432	619584.562	53.31
AVG. HEAD ON TOP OF LAYER 8	0.0200		
CHANGE IN WATER STORAGE	-6.585	-174493.266	-15.01
SOIL WATER AT START OF YEAR	353.579	9369492.000	
SOIL WATER AT END OF YEAR	346.994	9194999.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.101	0.00

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ANNUAL TOTALS FOR YEAR 25

	INCHES	CU. FEET	PERCENT
PRECIPITATION	54.04	1432005.750	100.00
RUNOFF	0.909	24100.154	1.68
EVAPOTRANSPIRATION	31.572	836621.937	58.42
PERC./LEAKAGE THROUGH LAYER 8	18.474205	489547.969	34.19
AVG. HEAD ON TOP OF LAYER 8	0.0157		
CHANGE IN WATER STORAGE	3.085	81736.250	5.71
SOIL WATER AT START OF YEAR	346.994	9194999.000	
SOIL WATER AT END OF YEAR	350.079	9276735.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.607	0.00

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ANNUAL TOTALS FOR YEAR 26

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.18	1091228.750	100.00

RUNOFF	0.025	657.391	0.06
EVAPOTRANSPIRATION	28.522	755801.875	69.26
PERC./LEAKAGE THROUGH LAYER 8	17.024338	451127.937	41.34
AVG. HEAD ON TOP OF LAYER 8	0.0143		
CHANGE IN WATER STORAGE	-4.391	-116359.305	-10.66
SOIL WATER AT START OF YEAR	350.079	9276735.000	
SOIL WATER AT END OF YEAR	345.688	9160376.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.809	0.00

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ANNUAL TOTALS FOR YEAR 27

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.72	1158536.500	100.00
RUNOFF	0.173	4573.507	0.39
EVAPOTRANSPIRATION	28.751	761865.000	65.76
PERC./LEAKAGE THROUGH LAYER 8	15.075960	399497.875	34.48
AVG. HEAD ON TOP OF LAYER 8	0.0127		
CHANGE IN WATER STORAGE	-0.279	-7399.471	-0.64
SOIL WATER AT START OF YEAR	345.688	9160376.000	
SOIL WATER AT END OF YEAR	345.408	9152976.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.505	0.00

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ANNUAL TOTALS FOR YEAR 28

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.18	1144226.750	100.00
RUNOFF	0.074	1959.458	0.17
EVAPOTRANSPIRATION	27.120	718639.687	62.81
PERC./LEAKAGE THROUGH LAYER 8	14.991589	397262.125	34.72
AVG. HEAD ON TOP OF LAYER 8	0.0127		
CHANGE IN WATER STORAGE	0.995	26365.566	2.30
SOIL WATER AT START OF YEAR	345.408	9152976.000	
SOIL WATER AT END OF YEAR	346.403	9179342.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.076	0.00

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ANNUAL TOTALS FOR YEAR 29

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.12	1036641.060	100.00
RUNOFF	2.164	57337.387	5.53
EVAPOTRANSPIRATION	22.195	588144.062	56.74
PERC./LEAKAGE THROUGH LAYER 8	15.597646	413322.031	39.87
AVG. HEAD ON TOP OF LAYER 8	0.0132		
CHANGE IN WATER STORAGE	-0.836	-22162.830	-2.14
SOIL WATER AT START OF YEAR	346.403	9179342.000	
SOIL WATER AT END OF YEAR	345.567	9157179.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.455	0.00

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ANNUAL TOTALS FOR YEAR 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.17	1143962.120	100.00
RUNOFF	0.069	1836.526	0.16
EVAPOTRANSPIRATION	29.792	789460.250	69.01
PERC./LEAKAGE THROUGH LAYER 8	10.864199	287890.406	25.17
AVG. HEAD ON TOP OF LAYER 8	0.0091		
CHANGE IN WATER STORAGE	2.444	64774.883	5.66
SOIL WATER AT START OF YEAR	345.567	9157179.000	
SOIL WATER AT END OF YEAR	348.011	9221954.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.000	0.00

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ANNUAL TOTALS FOR YEAR 31

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.99	1139192.000	100.00
RUNOFF	0.040	1064.999	0.09
EVAPOTRANSPIRATION	27.248	722046.375	63.38
PERC./LEAKAGE THROUGH LAYER 8	15.142792	401268.844	35.22
AVG. HEAD ON TOP OF LAYER 8	0.0126		
CHANGE IN WATER STORAGE	0.559	14811.166	1.30
SOIL WATER AT START OF YEAR	348.011	9221954.000	
SOIL WATER AT END OF YEAR	348.175	9226277.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.396	10487.936	0.92
ANNUAL WATER BUDGET BALANCE	0.0000	0.556	0.00

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ANNUAL TOTALS FOR YEAR 32

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.21	1039025.810	100.00
RUNOFF	0.201	5326.522	0.51
EVAPOTRANSPIRATION	26.408	699776.937	67.35
PERC./LEAKAGE THROUGH LAYER 8	15.196395	402689.281	38.76
AVG. HEAD ON TOP OF LAYER 8	0.0134		
CHANGE IN WATER STORAGE	-2.595	-68767.461	-6.62
SOIL WATER AT START OF YEAR	348.175	9226277.000	
SOIL WATER AT END OF YEAR	345.975	9167998.000	
SNOW WATER AT START OF YEAR	0.396	10487.936	1.01
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.505	0.00

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ANNUAL TOTALS FOR YEAR 33

	INCHES	CU. FEET	PERCENT
PRECIPITATION	62.53	1656982.620	100.00
RUNOFF	0.335	8877.324	0.54
EVAPOTRANSPIRATION	31.618	837832.187	50.56
PERC./LEAKAGE THROUGH LAYER 8	16.017485	424447.344	25.62
AVG. HEAD ON TOP OF LAYER 8	0.0135		
CHANGE IN WATER STORAGE	14.560	385827.000	23.28
SOIL WATER AT START OF YEAR	345.975	9167998.000	
SOIL WATER AT END OF YEAR	360.535	9553825.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.314	0.00

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ANNUAL TOTALS FOR YEAR 34

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.73	1079304.000	100.00
RUNOFF	0.128	3399.897	0.32
EVAPOTRANSPIRATION	28.761	762140.125	70.61
PERC./LEAKAGE THROUGH LAYER 8	28.010406	742247.750	68.77
AVG. HEAD ON TOP OF LAYER 8	0.0243		
CHANGE IN WATER STORAGE	-16.170	-428484.344	-39.70
SOIL WATER AT START OF YEAR	360.535	9553825.000	
SOIL WATER AT END OF YEAR	344.365	9125340.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.505	0.00

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ANNUAL TOTALS FOR YEAR 35

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.97	1509648.370	100.00
RUNOFF	0.771	20441.330	1.35
EVAPOTRANSPIRATION	29.580	783833.875	51.92
PERC./LEAKAGE THROUGH LAYER 8	12.660009	335477.594	22.22
AVG. HEAD ON TOP OF LAYER 8	0.0105		
CHANGE IN WATER STORAGE	13.959	369895.906	24.50
SOIL WATER AT START OF YEAR	344.365	9125340.000	
SOIL WATER AT END OF YEAR	358.324	9495236.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE	0.0000	-0.354	0.00

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ANNUAL TOTALS FOR YEAR 36

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.82	1373178.250	100.00
RUNOFF	0.533	14113.624	1.03
EVAPOTRANSPIRATION	26.182	693786.062	50.52
PERC./LEAKAGE THROUGH LAYER 8	27.736347	734985.500	53.52
AVG. HEAD ON TOP OF LAYER 8	0.0233		
CHANGE IN WATER STORAGE	-2.631	-69706.461	-5.08
SOIL WATER AT START OF YEAR	358.324	9495236.000	
SOIL WATER AT END OF YEAR	355.610	9423317.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.083	2212.348	0.16
ANNUAL WATER BUDGET BALANCE	0.0000	-0.404	0.00

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ANNUAL TOTALS FOR YEAR 37

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.38	1229023.620	100.00
RUNOFF	0.060	1589.649	0.13
EVAPOTRANSPIRATION	28.390	752301.562	61.21
PERC./LEAKAGE THROUGH LAYER 8	22.960350	608426.312	49.50
AVG. HEAD ON TOP OF LAYER 8	0.0193		
CHANGE IN WATER STORAGE	-5.030	-133294.219	-10.85
SOIL WATER AT START OF YEAR	355.610	9423317.000	
SOIL WATER AT END OF YEAR	350.309	9282828.000	

SNOW WATER AT START OF YEAR	0.083	2212.348	0.18
SNOW WATER AT END OF YEAR	0.355	9406.981	0.77
ANNUAL WATER BUDGET BALANCE	0.0000	0.354	0.00

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ANNUAL TOTALS FOR YEAR 38

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.44	1230613.500	100.00
RUNOFF	0.113	3005.474	0.24
EVAPOTRANSPIRATION	27.772	735920.375	59.80
PERC./LEAKAGE THROUGH LAYER 8	18.478529	489662.562	39.79
AVG. HEAD ON TOP OF LAYER 8	0.0154		
CHANGE IN WATER STORAGE	0.076	2024.594	0.16
SOIL WATER AT START OF YEAR	350.309	9282828.000	
SOIL WATER AT END OF YEAR	350.740	9294260.000	
SNOW WATER AT START OF YEAR	0.355	9406.981	0.76
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.556	0.00

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ANNUAL TOTALS FOR YEAR 39

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.20	1303750.500	100.00
RUNOFF	1.659	43971.469	3.37
EVAPOTRANSPIRATION	25.114	665497.812	51.04
PERC./LEAKAGE THROUGH LAYER 8	21.683414	574588.812	44.07
AVG. HEAD ON TOP OF LAYER 8	0.0185		
CHANGE IN WATER STORAGE	0.743	19693.105	1.51
SOIL WATER AT START OF YEAR	350.740	9294260.000	

SOIL WATER AT END OF YEAR	351.483	9313953.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.758	0.00

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ANNUAL TOTALS FOR YEAR 40

	INCHES	CU. FEET	PERCENT
PRECIPITATION	64.38	1706005.370	100.00
RUNOFF	0.726	19243.012	1.13
EVAPOTRANSPIRATION	33.060	876061.000	51.35
PERC./LEAKAGE THROUGH LAYER 8	19.947937	528600.375	30.98
AVG. HEAD ON TOP OF LAYER 8	0.0168		
CHANGE IN WATER STORAGE	10.646	282101.781	16.54
SOIL WATER AT START OF YEAR	351.483	9313953.000	
SOIL WATER AT END OF YEAR	362.129	9596055.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.859	0.00

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ANNUAL TOTALS FOR YEAR 41

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.89	1189540.370	100.00
RUNOFF	0.356	9424.412	0.79
EVAPOTRANSPIRATION	24.564	650911.250	54.72
PERC./LEAKAGE THROUGH LAYER 8	28.872374	765089.062	64.32
AVG. HEAD ON TOP OF LAYER 8	0.0249		

CHANGE IN WATER STORAGE	-8.902	-235886.219	-19.83
SOIL WATER AT START OF YEAR	362.129	9596055.000	
SOIL WATER AT END OF YEAR	353.227	9360169.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0001	1.820	0.00

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ANNUAL TOTALS FOR YEAR 42

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.63	1235648.500	100.00
RUNOFF	0.899	23814.504	1.93
EVAPOTRANSPIRATION	26.793	709997.625	57.46
PERC./LEAKAGE THROUGH LAYER 8	24.123251	639242.062	51.73
AVG. HEAD ON TOP OF LAYER 8	0.0204		
CHANGE IN WATER STORAGE	-5.185	-137406.141	-11.12
SOIL WATER AT START OF YEAR	353.227	9360169.000	
SOIL WATER AT END OF YEAR	348.042	9222763.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.455	0.00

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ANNUAL TOTALS FOR YEAR 43

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.82	1214184.000	100.00
RUNOFF	0.402	10661.614	0.88
EVAPOTRANSPIRATION	28.121	745184.125	61.37
PERC./LEAKAGE THROUGH LAYER 8	17.951487	475696.469	39.18

AVG. HEAD ON TOP OF LAYER 8	0.0152		
CHANGE IN WATER STORAGE	-0.655	-17357.426	-1.43
SOIL WATER AT START OF YEAR	348.042	9222763.000	
SOIL WATER AT END OF YEAR	346.674	9186508.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.713	18896.746	1.56
ANNUAL WATER BUDGET BALANCE	0.0000	-0.809	0.00

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ANNUAL TOTALS FOR YEAR 44

	INCHES	CU. FEET	PERCENT
PRECIPITATION	53.14	1408157.000	100.00
RUNOFF	0.778	20603.111	1.46
EVAPOTRANSPIRATION	27.223	721377.562	51.23
PERC./LEAKAGE THROUGH LAYER 8	16.536432	438198.937	31.12
AVG. HEAD ON TOP OF LAYER 8	0.0139		
CHANGE IN WATER STORAGE	8.603	227977.891	16.19
SOIL WATER AT START OF YEAR	346.674	9186508.000	
SOIL WATER AT END OF YEAR	355.990	9433383.000	
SNOW WATER AT START OF YEAR	0.713	18896.746	1.34
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.556	0.00

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ANNUAL TOTALS FOR YEAR 45

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.46	1363638.250	100.00
RUNOFF	1.089	28866.953	2.12

EVAPOTRANSPIRATION	30.573	810154.312	59.41
PERC./LEAKAGE THROUGH LAYER 8	26.419302	700085.125	51.34
AVG. HEAD ON TOP OF LAYER 8	0.0227		
CHANGE IN WATER STORAGE	-6.622	-175468.531	-12.87
SOIL WATER AT START OF YEAR	355.990	9433383.000	
SOIL WATER AT END OF YEAR	349.368	9257914.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.404	0.00

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ANNUAL TOTALS FOR YEAR 46

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.85	1082484.370	100.00
RUNOFF	0.065	1717.108	0.16
EVAPOTRANSPIRATION	27.908	739532.062	68.32
PERC./LEAKAGE THROUGH LAYER 8	16.413984	434954.187	40.18
AVG. HEAD ON TOP OF LAYER 8	0.0143		
CHANGE IN WATER STORAGE	-3.537	-93719.352	-8.66
SOIL WATER AT START OF YEAR	349.368	9257914.000	
SOIL WATER AT END OF YEAR	345.832	9164195.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.354	0.00

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ANNUAL TOTALS FOR YEAR 47

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.07	1194309.750	100.00

RUNOFF	0.214	5675.471	0.48
EVAPOTRANSPIRATION	26.457	701095.812	58.70
PERC./LEAKAGE THROUGH LAYER 8	15.553756	412159.000	34.51
AVG. HEAD ON TOP OF LAYER 8	0.0125		
CHANGE IN WATER STORAGE	2.845	75380.789	6.31
SOIL WATER AT START OF YEAR	345.832	9164195.000	
SOIL WATER AT END OF YEAR	348.676	9239576.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.314	0.00

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ANNUAL TOTALS FOR YEAR 48

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.82	1320180.000	100.00
RUNOFF	0.222	5874.079	0.44
EVAPOTRANSPIRATION	28.510	755499.437	57.23
PERC./LEAKAGE THROUGH LAYER 8	18.013954	477351.781	36.16
AVG. HEAD ON TOP OF LAYER 8	0.0153		
CHANGE IN WATER STORAGE	3.074	81455.422	6.17
SOIL WATER AT START OF YEAR	348.676	9239576.000	
SOIL WATER AT END OF YEAR	351.598	9316996.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.152	4035.124	0.31
ANNUAL WATER BUDGET BALANCE	0.0000	-0.758	0.00

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ANNUAL TOTALS FOR YEAR 49

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.15	1381922.500	100.00
RUNOFF	0.638	16914.994	1.22
EVAPOTRANSPIRATION	29.876	791675.562	57.29
PERC./LEAKAGE THROUGH LAYER 8	23.201921	614827.750	44.49
AVG. HEAD ON TOP OF LAYER 8	0.0196		
CHANGE IN WATER STORAGE	-1.566	-41495.855	-3.00
SOIL WATER AT START OF YEAR	351.598	9316996.000	
SOIL WATER AT END OF YEAR	350.184	9279536.000	
SNOW WATER AT START OF YEAR	0.152	4035.124	0.29
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.051	0.00

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ANNUAL TOTALS FOR YEAR 50

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.22	1383777.750	100.00
RUNOFF	1.249	33087.582	2.39
EVAPOTRANSPIRATION	30.386	805200.812	58.19
PERC./LEAKAGE THROUGH LAYER 8	20.830046	551975.375	39.89
AVG. HEAD ON TOP OF LAYER 8	0.0177		
CHANGE IN WATER STORAGE	-0.245	-6487.035	-0.47
SOIL WATER AT START OF YEAR	350.184	9279536.000	
SOIL WATER AT END OF YEAR	349.886	9271635.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.053	1413.820	0.10
ANNUAL WATER BUDGET BALANCE	0.0000	0.960	0.00

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ANNUAL TOTALS FOR YEAR 51

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.67	1316205.120	100.00
RUNOFF	2.474	65561.984	4.98
EVAPOTRANSPIRATION	26.592	704671.062	53.54
PERC./LEAKAGE THROUGH LAYER 8	17.746164	470255.625	35.73
AVG. HEAD ON TOP OF LAYER 8	0.0151		
CHANGE IN WATER STORAGE	2.857	75716.961	5.75
SOIL WATER AT START OF YEAR	349.886	9271635.000	
SOIL WATER AT END OF YEAR	352.797	9348765.000	
SNOW WATER AT START OF YEAR	0.053	1413.820	0.11
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.556	0.00

ANNUAL TOTALS FOR YEAR 52

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.06	1247042.870	100.00
RUNOFF	2.308	61153.098	4.90
EVAPOTRANSPIRATION	25.308	670646.125	53.78
PERC./LEAKAGE THROUGH LAYER 8	16.273029	431219.000	34.58
AVG. HEAD ON TOP OF LAYER 8	0.0144		
CHANGE IN WATER STORAGE	3.171	84025.570	6.74
SOIL WATER AT START OF YEAR	352.797	9348765.000	
SOIL WATER AT END OF YEAR	355.529	9421166.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.439	11624.781	0.93
ANNUAL WATER BUDGET BALANCE	0.0000	-0.910	0.00

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ANNUAL TOTALS FOR YEAR 53

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.80	1372648.120	100.00
RUNOFF	0.177	4692.827	0.34
EVAPOTRANSPIRATION	28.250	748597.937	54.54
PERC./LEAKAGE THROUGH LAYER 8	23.990135	635714.625	46.31
AVG. HEAD ON TOP OF LAYER 8	0.0203		
CHANGE IN WATER STORAGE	-0.617	-16358.017	-1.19
SOIL WATER AT START OF YEAR	355.529	9421166.000	
SOIL WATER AT END OF YEAR	355.350	9416433.000	
SNOW WATER AT START OF YEAR	0.439	11624.781	0.85
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.758	0.00

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ANNUAL TOTALS FOR YEAR 54

	INCHES	CU. FEET	PERCENT
PRECIPITATION	53.49	1417431.750	100.00
RUNOFF	0.772	20468.617	1.44
EVAPOTRANSPIRATION	29.290	776152.562	54.76
PERC./LEAKAGE THROUGH LAYER 8	24.484432	648813.000	45.77
AVG. HEAD ON TOP OF LAYER 8	0.0203		
CHANGE IN WATER STORAGE	-1.057	-28002.346	-1.98
SOIL WATER AT START OF YEAR	355.350	9416433.000	
SOIL WATER AT END OF YEAR	354.294	9388431.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.152	0.00

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ANNUAL TOTALS FOR YEAR 55

	INCHES	CU. FEET	PERCENT
PRECIPITATION	50.78	1345619.250	100.00
RUNOFF	0.707	18746.189	1.39
EVAPOTRANSPIRATION	28.449	753879.875	56.02
PERC./LEAKAGE THROUGH LAYER 8	21.856052	579163.562	43.04
AVG. HEAD ON TOP OF LAYER 8	0.0189		
CHANGE IN WATER STORAGE	-0.233	-6169.460	-0.46
SOIL WATER AT START OF YEAR	354.294	9388431.000	
SOIL WATER AT END OF YEAR	354.061	9382261.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.960	0.00

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ANNUAL TOTALS FOR YEAR 56

	INCHES	CU. FEET	PERCENT
PRECIPITATION	55.93	1482089.000	100.00
RUNOFF	0.347	9189.511	0.62
EVAPOTRANSPIRATION	30.063	796639.687	53.75
PERC./LEAKAGE THROUGH LAYER 8	22.905504	606973.000	40.95
AVG. HEAD ON TOP OF LAYER 8	0.0198		
CHANGE IN WATER STORAGE	2.615	69286.539	4.67
SOIL WATER AT START OF YEAR	354.061	9382261.000	
SOIL WATER AT END OF YEAR	356.676	9451548.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE	0.0000	0.303	0.00

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ANNUAL TOTALS FOR YEAR 57

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.70	1369998.500	100.00
RUNOFF	0.741	19633.387	1.43
EVAPOTRANSPIRATION	28.493	755027.187	55.11
PERC./LEAKAGE THROUGH LAYER 8	24.427057	647292.625	47.25
AVG. HEAD ON TOP OF LAYER 8	0.0211		
CHANGE IN WATER STORAGE	-1.961	-51954.797	-3.79
SOIL WATER AT START OF YEAR	356.676	9451548.000	
SOIL WATER AT END OF YEAR	354.715	9399593.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.101	0.00

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ANNUAL TOTALS FOR YEAR 58

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.32	1094938.620	100.00
RUNOFF	0.121	3216.100	0.29
EVAPOTRANSPIRATION	25.865	685394.812	62.60
PERC./LEAKAGE THROUGH LAYER 8	20.676134	547896.875	50.04
AVG. HEAD ON TOP OF LAYER 8	0.0176		
CHANGE IN WATER STORAGE	-5.342	-141569.250	-12.93
SOIL WATER AT START OF YEAR	354.715	9399593.000	
SOIL WATER AT END OF YEAR	349.373	9258024.000	

SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.051	0.00

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ANNUAL TOTALS FOR YEAR 59

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.47	1231408.370	100.00
RUNOFF	1.720	45582.168	3.70
EVAPOTRANSPIRATION	29.893	792135.875	64.33
PERC./LEAKAGE THROUGH LAYER 8	19.022810	504085.469	40.94
AVG. HEAD ON TOP OF LAYER 8	0.0164		
CHANGE IN WATER STORAGE	-4.166	-110395.852	-8.97
SOIL WATER AT START OF YEAR	349.373	9258024.000	
SOIL WATER AT END OF YEAR	345.166	9146557.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.040	1070.901	0.09
ANNUAL WATER BUDGET BALANCE	0.0000	0.758	0.00

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ANNUAL TOTALS FOR YEAR 60

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.65	997687.437	100.00
RUNOFF	0.147	3900.041	0.39
EVAPOTRANSPIRATION	25.566	677479.750	67.91
PERC./LEAKAGE THROUGH LAYER 8	12.049893	319310.125	32.01
AVG. HEAD ON TOP OF LAYER 8	0.0101		
CHANGE IN WATER STORAGE	-0.113	-3002.427	-0.30
SOIL WATER AT START OF YEAR	345.166	9146557.000	

SOIL WATER AT END OF YEAR	344.188	9120639.000	
SNOW WATER AT START OF YEAR	0.040	1070.901	0.11
SNOW WATER AT END OF YEAR	0.905	23986.838	2.40
ANNUAL WATER BUDGET BALANCE	0.0000	-0.101	0.00

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ANNUAL TOTALS FOR YEAR 61

	INCHES	CU. FEET	PERCENT
PRECIPITATION	53.68	1422466.000	100.00
RUNOFF	1.698	44991.082	3.16
EVAPOTRANSPIRATION	32.221	853828.312	60.02
PERC./LEAKAGE THROUGH LAYER 8	15.202544	402852.219	28.32
AVG. HEAD ON TOP OF LAYER 8	0.0128		
CHANGE IN WATER STORAGE	4.558	120795.320	8.49
SOIL WATER AT START OF YEAR	344.188	9120639.000	
SOIL WATER AT END OF YEAR	349.652	9265421.000	
SNOW WATER AT START OF YEAR	0.905	23986.838	1.69
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.036	0.00

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ANNUAL TOTALS FOR YEAR 62

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.67	1210209.370	100.00
RUNOFF	0.277	7350.870	0.61
EVAPOTRANSPIRATION	23.788	630360.062	52.09
PERC./LEAKAGE THROUGH LAYER 8	19.556688	518232.687	42.82
AVG. HEAD ON TOP OF LAYER 8	0.0168		

CHANGE IN WATER STORAGE	2.048	54266.020	4.48
SOIL WATER AT START OF YEAR	349.652	9265421.000	
SOIL WATER AT END OF YEAR	351.700	9319687.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.202	0.00

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ANNUAL TOTALS FOR YEAR 63

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.99	980198.187	100.00
RUNOFF	0.097	2570.170	0.26
EVAPOTRANSPIRATION	24.940	660879.500	67.42
PERC./LEAKAGE THROUGH LAYER 8	19.369360	513268.687	52.36
AVG. HEAD ON TOP OF LAYER 8	0.0166		
CHANGE IN WATER STORAGE	-7.416	-196521.844	-20.05
SOIL WATER AT START OF YEAR	351.700	9319687.000	
SOIL WATER AT END OF YEAR	344.283	9123165.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0001	1.668	0.00

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ANNUAL TOTALS FOR YEAR 64

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.70	1158006.500	100.00
RUNOFF	1.092	28942.629	2.50
EVAPOTRANSPIRATION	30.063	796628.562	68.79
PERC./LEAKAGE THROUGH LAYER 8	12.666837	335658.500	28.99

AVG. HEAD ON TOP OF LAYER 8	0.0109		
CHANGE IN WATER STORAGE	-0.122	-3222.611	-0.28
SOIL WATER AT START OF YEAR	344.283	9123165.000	
SOIL WATER AT END OF YEAR	344.162	9119942.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.657	0.00

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ANNUAL TOTALS FOR YEAR 65

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.88	1215774.120	100.00
RUNOFF	0.369	9771.297	0.80
EVAPOTRANSPIRATION	29.662	786025.437	64.65
PERC./LEAKAGE THROUGH LAYER 8	14.670343	388749.437	31.98
AVG. HEAD ON TOP OF LAYER 8	0.0125		
CHANGE IN WATER STORAGE	1.178	31228.191	2.57
SOIL WATER AT START OF YEAR	344.162	9119942.000	
SOIL WATER AT END OF YEAR	345.340	9151170.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.202	0.00

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ANNUAL TOTALS FOR YEAR 66

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.85	1082483.870	100.00
RUNOFF	2.098	55600.324	5.14

EVAPOTRANSPIRATION	24.182	640806.562	59.20
PERC./LEAKAGE THROUGH LAYER 8	11.773831	311994.750	28.82
AVG. HEAD ON TOP OF LAYER 8	0.0099		
CHANGE IN WATER STORAGE	2.796	74082.047	6.84
SOIL WATER AT START OF YEAR	345.340	9151170.000	
SOIL WATER AT END OF YEAR	348.136	9225253.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.101	0.00

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ANNUAL TOTALS FOR YEAR 67

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.91	1216568.870	100.00
RUNOFF	3.024	80132.562	6.59
EVAPOTRANSPIRATION	23.301	617444.375	50.75
PERC./LEAKAGE THROUGH LAYER 8	16.249832	430604.312	35.39
AVG. HEAD ON TOP OF LAYER 8	0.0137		
CHANGE IN WATER STORAGE	3.336	88388.547	7.27
SOIL WATER AT START OF YEAR	348.136	9225253.000	
SOIL WATER AT END OF YEAR	351.020	9301690.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.451	11950.803	0.98
ANNUAL WATER BUDGET BALANCE	0.0000	-1.011	0.00

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ANNUAL TOTALS FOR YEAR 68

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.56	1392787.620	100.00

RUNOFF	5.691	150803.891	10.83
EVAPOTRANSPIRATION	27.064	717160.875	51.49
PERC./LEAKAGE THROUGH LAYER 8	20.026907	530693.000	38.10
AVG. HEAD ON TOP OF LAYER 8	0.0168		
CHANGE IN WATER STORAGE	-0.222	-5870.149	-0.42
SOIL WATER AT START OF YEAR	351.020	9301690.000	
SOIL WATER AT END OF YEAR	350.014	9275034.000	
SNOW WATER AT START OF YEAR	0.451	11950.803	0.86
SNOW WATER AT END OF YEAR	1.235	32737.348	2.35
ANNUAL WATER BUDGET BALANCE	0.0000	-0.051	0.00

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ANNUAL TOTALS FOR YEAR 69

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.86	1294741.250	100.00
RUNOFF	0.313	8286.025	0.64
EVAPOTRANSPIRATION	28.304	750033.250	57.93
PERC./LEAKAGE THROUGH LAYER 8	21.073587	558429.000	43.13
AVG. HEAD ON TOP OF LAYER 8	0.0181		
CHANGE IN WATER STORAGE	-0.830	-22005.695	-1.70
SOIL WATER AT START OF YEAR	350.014	9275034.000	
SOIL WATER AT END OF YEAR	350.418	9285725.000	
SNOW WATER AT START OF YEAR	1.235	32737.348	2.53
SNOW WATER AT END OF YEAR	0.002	40.024	0.00
ANNUAL WATER BUDGET BALANCE	-0.0001	-1.415	0.00

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ANNUAL TOTALS FOR YEAR 70

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.28	1279371.500	100.00
RUNOFF	0.438	11594.160	0.91
EVAPOTRANSPIRATION	28.886	765449.687	59.83
PERC./LEAKAGE THROUGH LAYER 8	19.742487	523156.187	40.89
AVG. HEAD ON TOP OF LAYER 8	0.0170		
CHANGE IN WATER STORAGE	-0.786	-20828.896	-1.63
SOIL WATER AT START OF YEAR	350.418	9285725.000	
SOIL WATER AT END OF YEAR	349.633	9264936.000	
SNOW WATER AT START OF YEAR	0.002	40.024	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.354	0.00

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ANNUAL TOTALS FOR YEAR 71

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.18	1223723.870	100.00
RUNOFF	0.174	4598.462	0.38
EVAPOTRANSPIRATION	30.699	813493.625	66.48
PERC./LEAKAGE THROUGH LAYER 8	19.332952	512303.906	41.86
AVG. HEAD ON TOP OF LAYER 8	0.0164		
CHANGE IN WATER STORAGE	-4.026	-106672.680	-8.72
SOIL WATER AT START OF YEAR	349.633	9264936.000	
SOIL WATER AT END OF YEAR	345.590	9157788.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.018	475.692	0.04
ANNUAL WATER BUDGET BALANCE	0.0000	0.556	0.00

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ANNUAL TOTALS FOR YEAR 72

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.34	1625448.500	100.00
RUNOFF	0.433	11467.438	0.71
EVAPOTRANSPIRATION	32.145	851804.937	52.40
PERC./LEAKAGE THROUGH LAYER 8	14.342459	380060.812	23.38
AVG. HEAD ON TOP OF LAYER 8	0.0120		
CHANGE IN WATER STORAGE	14.420	382115.750	23.51
SOIL WATER AT START OF YEAR	345.590	9157788.000	
SOIL WATER AT END OF YEAR	360.028	9540379.000	
SNOW WATER AT START OF YEAR	0.018	475.692	0.03
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.455	0.00

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ANNUAL TOTALS FOR YEAR 73

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.73	1158801.370	100.00
RUNOFF	2.457	65118.289	5.62
EVAPOTRANSPIRATION	26.620	705415.500	60.87
PERC./LEAKAGE THROUGH LAYER 8	27.469183	727905.875	62.82
AVG. HEAD ON TOP OF LAYER 8	0.0237		
CHANGE IN WATER STORAGE	-12.817	-339638.937	-29.31
SOIL WATER AT START OF YEAR	360.028	9540379.000	
SOIL WATER AT END OF YEAR	347.211	9200740.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.657	0.00

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ANNUAL TOTALS FOR YEAR 74

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.32	1492423.620	100.00
RUNOFF	0.612	16225.525	1.09
EVAPOTRANSPIRATION	29.985	794565.562	53.24
PERC./LEAKAGE THROUGH LAYER 8	16.143852	427795.937	28.66
AVG. HEAD ON TOP OF LAYER 8	0.0136		
CHANGE IN WATER STORAGE	9.579	253837.422	17.01
SOIL WATER AT START OF YEAR	347.211	9200740.000	
SOIL WATER AT END OF YEAR	356.790	9454578.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.859	0.00

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ANNUAL TOTALS FOR YEAR 75

	INCHES	CU. FEET	PERCENT
PRECIPITATION	54.80	1452145.120	100.00
RUNOFF	0.242	6402.931	0.44
EVAPOTRANSPIRATION	33.213	880119.437	60.61
PERC./LEAKAGE THROUGH LAYER 8	23.874113	632640.125	43.57
AVG. HEAD ON TOP OF LAYER 8	0.0205		
CHANGE IN WATER STORAGE	-2.529	-67017.164	-4.62
SOIL WATER AT START OF YEAR	356.790	9454578.000	
SOIL WATER AT END OF YEAR	353.709	9372939.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.552	14622.043	1.01
ANNUAL WATER BUDGET BALANCE	0.0000	-0.202	0.00

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ANNUAL TOTALS FOR YEAR 76

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.40	1256052.370	100.00
RUNOFF	0.218	5786.751	0.46
EVAPOTRANSPIRATION	29.439	780108.812	62.11
PERC./LEAKAGE THROUGH LAYER 8	19.505014	516863.375	41.15
AVG. HEAD ON TOP OF LAYER 8	0.0168		
CHANGE IN WATER STORAGE	-1.763	-46705.820	-3.72
SOIL WATER AT START OF YEAR	353.709	9372939.000	
SOIL WATER AT END OF YEAR	352.498	9340855.000	
SNOW WATER AT START OF YEAR	0.552	14622.043	1.16
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.758	0.00

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ANNUAL TOTALS FOR YEAR 77

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.45	1098383.250	100.00
RUNOFF	0.051	1343.109	0.12
EVAPOTRANSPIRATION	29.853	791083.750	72.02
PERC./LEAKAGE THROUGH LAYER 8	17.883570	473896.719	43.14
AVG. HEAD ON TOP OF LAYER 8	0.0152		
CHANGE IN WATER STORAGE	-6.338	-167940.484	-15.29
SOIL WATER AT START OF YEAR	352.498	9340855.000	
SOIL WATER AT END OF YEAR	346.161	9172914.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE	0.0000	0.152	0.00

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ANNUAL TOTALS FOR YEAR 78

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.00	1616438.750	100.00
RUNOFF	0.794	21041.984	1.30
EVAPOTRANSPIRATION	30.249	801579.437	49.59
PERC./LEAKAGE THROUGH LAYER 8	19.209837	509041.469	31.49
AVG. HEAD ON TOP OF LAYER 8	0.0163		
CHANGE IN WATER STORAGE	10.747	284776.906	17.62
SOIL WATER AT START OF YEAR	346.161	9172914.000	
SOIL WATER AT END OF YEAR	356.907	9457691.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.112	0.00

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ANNUAL TOTALS FOR YEAR 79

	INCHES	CU. FEET	PERCENT
PRECIPITATION	54.80	1452145.250	100.00
RUNOFF	1.713	45386.543	3.13
EVAPOTRANSPIRATION	30.690	813261.312	56.00
PERC./LEAKAGE THROUGH LAYER 8	27.297962	723368.750	49.81
AVG. HEAD ON TOP OF LAYER 8	0.0230		
CHANGE IN WATER STORAGE	-4.901	-129872.430	-8.94
SOIL WATER AT START OF YEAR	356.907	9457691.000	
SOIL WATER AT END OF YEAR	352.006	9327819.000	

SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.061	0.00

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ANNUAL TOTALS FOR YEAR 80

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.05	1140782.500	100.00
RUNOFF	0.067	1774.690	0.16
EVAPOTRANSPIRATION	26.906	712972.625	62.50
PERC./LEAKAGE THROUGH LAYER 8	19.857187	526195.625	46.13
AVG. HEAD ON TOP OF LAYER 8	0.0169		
CHANGE IN WATER STORAGE	-3.780	-100161.508	-8.78
SOIL WATER AT START OF YEAR	352.006	9327819.000	
SOIL WATER AT END OF YEAR	347.453	9207161.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.773	20496.766	1.80
ANNUAL WATER BUDGET BALANCE	0.0000	1.011	0.00

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ANNUAL TOTALS FOR YEAR 81

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.73	1370793.370	100.00
RUNOFF	5.881	155845.641	11.37
EVAPOTRANSPIRATION	23.969	635144.062	46.33
PERC./LEAKAGE THROUGH LAYER 8	16.991856	450267.187	32.85
AVG. HEAD ON TOP OF LAYER 8	0.0145		
CHANGE IN WATER STORAGE	4.888	129536.945	9.45
SOIL WATER AT START OF YEAR	347.453	9207161.000	

SOIL WATER AT END OF YEAR	349.204	9253565.000	
SNOW WATER AT START OF YEAR	0.773	20496.766	1.50
SNOW WATER AT END OF YEAR	3.911	103628.922	7.56
ANNUAL WATER BUDGET BALANCE	0.0000	-0.455	0.00

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ANNUAL TOTALS FOR YEAR 82

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.33	1492688.750	100.00
RUNOFF	8.655	229352.484	15.37
EVAPOTRANSPIRATION	27.632	732219.687	49.05
PERC./LEAKAGE THROUGH LAYER 8	17.672386	468300.562	31.37
AVG. HEAD ON TOP OF LAYER 8	0.0150		
CHANGE IN WATER STORAGE	2.370	62815.496	4.21
SOIL WATER AT START OF YEAR	349.204	9253565.000	
SOIL WATER AT END OF YEAR	355.485	9420010.000	
SNOW WATER AT START OF YEAR	3.911	103628.922	6.94
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.505	0.00

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ANNUAL TOTALS FOR YEAR 83

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.13	1248898.250	100.00
RUNOFF	5.716	151481.187	12.13
EVAPOTRANSPIRATION	25.302	670471.750	53.69
PERC./LEAKAGE THROUGH LAYER 8	22.587221	598538.812	47.93
AVG. HEAD ON TOP OF LAYER 8	0.0195		

CHANGE IN WATER STORAGE	-6.475	-171593.312	-13.74
SOIL WATER AT START OF YEAR	355.485	9420010.000	
SOIL WATER AT END OF YEAR	349.010	9248416.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.152	0.00

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ANNUAL TOTALS FOR YEAR 84

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.07	1273807.120	100.00
RUNOFF	0.420	11138.554	0.87
EVAPOTRANSPIRATION	26.901	712860.875	55.96
PERC./LEAKAGE THROUGH LAYER 8	20.405346	540721.250	42.45
AVG. HEAD ON TOP OF LAYER 8	0.0176		
CHANGE IN WATER STORAGE	0.343	9085.633	0.71
SOIL WATER AT START OF YEAR	349.010	9248416.000	
SOIL WATER AT END OF YEAR	348.881	9245008.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.471	12494.241	0.98
ANNUAL WATER BUDGET BALANCE	0.0000	0.758	0.00

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ANNUAL TOTALS FOR YEAR 85

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.54	1100768.250	100.00
RUNOFF	0.030	802.190	0.07
EVAPOTRANSPIRATION	28.188	746955.250	67.86
PERC./LEAKAGE THROUGH LAYER 8	16.159327	428206.000	38.90

AVG. HEAD ON TOP OF LAYER 8	0.0134		
CHANGE IN WATER STORAGE	-2.838	-75194.844	-6.83
SOIL WATER AT START OF YEAR	348.881	9245008.000	
SOIL WATER AT END OF YEAR	346.515	9182307.000	
SNOW WATER AT START OF YEAR	0.471	12494.241	1.14
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.303	0.00

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ANNUAL TOTALS FOR YEAR 86

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.93	1296596.000	100.00
RUNOFF	1.581	41907.383	3.23
EVAPOTRANSPIRATION	26.521	702767.062	54.20
PERC./LEAKAGE THROUGH LAYER 8	17.794573	471538.406	36.37
AVG. HEAD ON TOP OF LAYER 8	0.0150		
CHANGE IN WATER STORAGE	3.033	80383.320	6.20
SOIL WATER AT START OF YEAR	346.515	9182307.000	
SOIL WATER AT END OF YEAR	349.549	9262691.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.202	0.00

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ANNUAL TOTALS FOR YEAR 87

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.91	1163571.620	100.00
RUNOFF	2.822	74788.180	6.43

EVAPOTRANSPIRATION	24.362	645563.687	55.48
PERC./LEAKAGE THROUGH LAYER 8	13.804260	365799.094	31.44
AVG. HEAD ON TOP OF LAYER 8	0.0120		
CHANGE IN WATER STORAGE	2.922	77419.187	6.65
SOIL WATER AT START OF YEAR	349.549	9262691.000	
SOIL WATER AT END OF YEAR	350.299	9282581.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.171	57528.766	4.94
ANNUAL WATER BUDGET BALANCE	0.0001	1.466	0.00

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ANNUAL TOTALS FOR YEAR 88

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.10	1248102.750	100.00
RUNOFF	3.030	80301.781	6.43
EVAPOTRANSPIRATION	27.437	727055.625	58.25
PERC./LEAKAGE THROUGH LAYER 8	18.721003	496087.875	39.75
AVG. HEAD ON TOP OF LAYER 8	0.0160		
CHANGE IN WATER STORAGE	-2.088	-55341.273	-4.43
SOIL WATER AT START OF YEAR	350.299	9282581.000	
SOIL WATER AT END OF YEAR	350.382	9284769.000	
SNOW WATER AT START OF YEAR	2.171	57528.766	4.61
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	-0.0001	-1.365	0.00

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ANNUAL TOTALS FOR YEAR 89

	INCHES	CU. FEET	PERCENT
PRECIPITATION	55.07	1459300.000	100.00

RUNOFF	0.716	18975.053	1.30
EVAPOTRANSPIRATION	32.530	862008.375	59.07
PERC./LEAKAGE THROUGH LAYER 8	19.269775	510629.781	34.99
AVG. HEAD ON TOP OF LAYER 8	0.0162		
CHANGE IN WATER STORAGE	2.554	67686.961	4.64
SOIL WATER AT START OF YEAR	350.382	9284769.000	
SOIL WATER AT END OF YEAR	352.936	9352455.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.152	0.00

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ANNUAL TOTALS FOR YEAR 90

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.60	1181855.250	100.00
RUNOFF	0.029	778.118	0.07
EVAPOTRANSPIRATION	27.333	724304.312	61.29
PERC./LEAKAGE THROUGH LAYER 8	21.917112	580781.562	49.14
AVG. HEAD ON TOP OF LAYER 8	0.0184		
CHANGE IN WATER STORAGE	-4.680	-124008.656	-10.49
SOIL WATER AT START OF YEAR	352.936	9352455.000	
SOIL WATER AT END OF YEAR	348.256	9228447.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.152	0.00

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ANNUAL TOTALS FOR YEAR 91

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.39	1494278.870	100.00
RUNOFF	0.492	13045.365	0.87
EVAPOTRANSPIRATION	33.204	879879.750	58.88
PERC./LEAKAGE THROUGH LAYER 8	16.683088	442085.156	29.59
AVG. HEAD ON TOP OF LAYER 8	0.0141		
CHANGE IN WATER STORAGE	6.010	159268.141	10.66
SOIL WATER AT START OF YEAR	348.256	9228447.000	
SOIL WATER AT END OF YEAR	354.267	9387715.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.505	0.00

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ANNUAL TOTALS FOR YEAR 92

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.54	994772.687	100.00
RUNOFF	0.435	11527.156	1.16
EVAPOTRANSPIRATION	24.890	659549.562	66.30
PERC./LEAKAGE THROUGH LAYER 8	19.941286	528424.125	53.12
AVG. HEAD ON TOP OF LAYER 8	0.0170		
CHANGE IN WATER STORAGE	-7.726	-204728.391	-20.58
SOIL WATER AT START OF YEAR	354.267	9387715.000	
SOIL WATER AT END OF YEAR	346.541	9182987.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.202	0.00

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ANNUAL TOTALS FOR YEAR 93

	INCHES	CU. FEET	PERCENT
PRECIPITATION	53.15	1408421.370	100.00
RUNOFF	0.755	20006.010	1.42
EVAPOTRANSPIRATION	29.004	768569.312	54.57
PERC./LEAKAGE THROUGH LAYER 8	14.888210	394522.687	28.01
AVG. HEAD ON TOP OF LAYER 8	0.0128		
CHANGE IN WATER STORAGE	8.503	225323.984	16.00
SOIL WATER AT START OF YEAR	346.541	9182987.000	
SOIL WATER AT END OF YEAR	355.044	9408311.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.607	0.00

ANNUAL TOTALS FOR YEAR 94

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.19	1144491.750	100.00
RUNOFF	0.165	4366.826	0.38
EVAPOTRANSPIRATION	26.712	707839.187	61.85
PERC./LEAKAGE THROUGH LAYER 8	23.994200	635822.312	55.55
AVG. HEAD ON TOP OF LAYER 8	0.0203		
CHANGE IN WATER STORAGE	-7.681	-203535.578	-17.78
SOIL WATER AT START OF YEAR	355.044	9408311.000	
SOIL WATER AT END OF YEAR	347.363	9204775.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.960	0.00

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ANNUAL TOTALS FOR YEAR 95

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.93	1111103.250	100.00
RUNOFF	0.068	1800.471	0.16
EVAPOTRANSPIRATION	28.676	759893.937	68.39
PERC./LEAKAGE THROUGH LAYER 8	13.650006	361711.531	32.55
AVG. HEAD ON TOP OF LAYER 8	0.0116		
CHANGE IN WATER STORAGE	-0.464	-12304.328	-1.11
SOIL WATER AT START OF YEAR	347.363	9204775.000	
SOIL WATER AT END OF YEAR	346.516	9182334.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.383	10136.689	0.91
ANNUAL WATER BUDGET BALANCE	0.0001	1.592	0.00

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ANNUAL TOTALS FOR YEAR 96

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.34	1068970.120	100.00
RUNOFF	0.277	7335.537	0.69
EVAPOTRANSPIRATION	24.579	651307.437	60.93
PERC./LEAKAGE THROUGH LAYER 8	14.226581	376990.156	35.27
AVG. HEAD ON TOP OF LAYER 8	0.0121		
CHANGE IN WATER STORAGE	1.258	33337.422	3.12
SOIL WATER AT START OF YEAR	346.516	9182334.000	
SOIL WATER AT END OF YEAR	348.157	9225808.000	
SNOW WATER AT START OF YEAR	0.383	10136.689	0.95
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.505	0.00

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ANNUAL TOTALS FOR YEAR 97

	INCHES	CU. FEET	PERCENT
PRECIPITATION	58.44	1548601.500	100.00
RUNOFF	1.064	28195.729	1.82
EVAPOTRANSPIRATION	29.025	769146.625	49.67
PERC./LEAKAGE THROUGH LAYER 8	15.772467	417954.594	26.99
AVG. HEAD ON TOP OF LAYER 8	0.0134		
CHANGE IN WATER STORAGE	12.578	333303.687	21.52
SOIL WATER AT START OF YEAR	348.157	9225808.000	
SOIL WATER AT END OF YEAR	360.735	9559112.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.809	0.00

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ANNUAL TOTALS FOR YEAR 98

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.38	1626508.500	100.00
RUNOFF	1.002	26557.125	1.63
EVAPOTRANSPIRATION	31.615	837766.250	51.51
PERC./LEAKAGE THROUGH LAYER 8	25.744268	682197.375	41.94
AVG. HEAD ON TOP OF LAYER 8	0.0218		
CHANGE IN WATER STORAGE	3.019	79988.727	4.92
SOIL WATER AT START OF YEAR	360.735	9559112.000	
SOIL WATER AT END OF YEAR	363.506	9632534.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.248	6566.568	0.40

ANNUAL WATER BUDGET BALANCE	0.0000	-1.011	0.00

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ANNUAL TOTALS FOR YEAR 99

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.36	1387487.750	100.00
RUNOFF	0.802	21241.375	1.53
EVAPOTRANSPIRATION	29.721	787572.437	56.76
PERC./LEAKAGE THROUGH LAYER 8	30.960459	820421.187	59.13
AVG. HEAD ON TOP OF LAYER 8	0.0267		
CHANGE IN WATER STORAGE	-9.123	-241746.812	-17.42
SOIL WATER AT START OF YEAR	363.506	9632534.000	
SOIL WATER AT END OF YEAR	354.630	9397354.000	
SNOW WATER AT START OF YEAR	0.248	6566.568	0.47
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.556	0.00

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ANNUAL TOTALS FOR YEAR 100

	INCHES	CU. FEET	PERCENT
PRECIPITATION	50.10	1327599.750	100.00
RUNOFF	8.241	218372.578	16.45
EVAPOTRANSPIRATION	24.364	645629.875	48.63
PERC./LEAKAGE THROUGH LAYER 8	21.762918	576695.562	43.44
AVG. HEAD ON TOP OF LAYER 8	0.0186		
CHANGE IN WATER STORAGE	-4.268	-113098.680	-8.52
SOIL WATER AT START OF YEAR	354.630	9397354.000	
SOIL WATER AT END OF YEAR	350.362	9284255.000	

SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.404	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 100

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.68	4.02	4.98	4.24	4.31	4.45
	4.17	4.78	3.51	3.46	3.04	3.57
STD. DEVIATIONS	1.72	1.77	2.33	2.09	1.94	1.86
	1.56	2.33	1.92	1.94	1.79	1.83
RUNOFF						
TOTALS	0.149	0.516	0.088	0.017	0.016	0.022
	0.010	0.048	0.053	0.047	0.034	0.025
STD. DEVIATIONS	0.439	1.314	0.246	0.058	0.043	0.078
	0.035	0.143	0.143	0.124	0.093	0.060
EVAPOTRANSPIRATION						
TOTALS	1.180	1.435	2.658	2.995	3.396	3.689
	3.534	3.354	2.182	1.542	1.208	0.919
STD. DEVIATIONS	0.255	0.377	0.382	0.787	1.030	1.129
	0.973	1.042	0.828	0.386	0.227	0.171
PERCOLATION/LEAKAGE THROUGH LAYER 8						
TOTALS	1.9627	1.5780	1.5494	1.4339	1.3140	1.4187
	1.3384	1.3661	1.4306	1.5661	1.9779	2.1187
STD. DEVIATIONS	1.1223	0.9040	0.7548	0.6647	0.6280	0.7134
	0.8608	0.7385	0.8802	1.0120	1.1536	1.2205

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 8						
AVERAGES	0.0192	0.0171	0.0154	0.0149	0.0134	0.0149
	0.0137	0.0139	0.0151	0.0157	0.0203	0.0208

STD. DEVIATIONS	0.0110	0.0099	0.0077	0.0071	0.0064	0.0076
	0.0088	0.0075	0.0093	0.0102	0.0119	0.0120

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 100

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.18 (6.129)	1276851.7	100.00
RUNOFF	1.025 (1.5785)	27168.72	2.128
EVAPOTRANSPIRATION	28.092 (2.5561)	744415.12	58.301
PERCOLATION/LEAKAGE THROUGH LAYER 8	19.05448 (4.27035)	504924.562	39.54449
AVERAGE HEAD ON TOP OF LAYER 8	0.016 (0.004)		
CHANGE IN WATER STORAGE	0.013 (5.7830)	343.17	0.027

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 100

	(INCHES)	(CU. FT.)
PRECIPITATION	5.05	133819.953
RUNOFF	2.950	78170.6562
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.276258	7320.55518
AVERAGE HEAD ON TOP OF LAYER 8	0.078	
SNOW WATER	7.42	196656.0000
MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3980	
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1360	

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FINAL WATER STORAGE AT END OF YEAR 100

LAYER	(INCHES)	(VOL/VOL)
1	1.2375	0.2062
2	4.9644	0.2758
3	37.0486	0.3087
4	72.9022	0.3038
5	72.2961	0.3012
6	70.0800	0.2920
7	70.0898	0.2920
8	21.7440	0.4530
SNOW WATER	0.000	

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APPENDIX D

BIOSCREEN Output Spreadsheets

BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence — *Version 1.4*

Run Name: *Jackson County* / *Dillsboro Landfill*

Data Input Instructions:

115	1. Enter value directly....or
↑ or	2. Calculate by filling in grey
0.02	cells below. (To restore formulas, hit button below).
Variable*	Data used directly in model.
20	Value calculated by model. (Don't enter any data).

1. HYDROGEOLOGY

Seepage Velocity*	Vs	36.8	(ft/yr)
or		↑ or	
Hydraulic Conductivity	K	1.0E-04	(cm/sec)
Hydraulic Gradient	i	0.08893	(ft/ft)
Porosity	n	0.25	(-)

2. DISPERSION

Longitudinal Dispersivity*	alpha x	17.9	(ft)
Transverse Dispersivity*	alpha y	1.8	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
or		↑ or	
Estimated Plume Length	Lp	500	(ft)

3. ADSORPTION

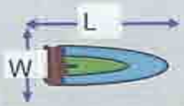
Retardation Factor*	R	1.0	(-)
or		↑ or	
Soil Bulk Density	rho		(kg/l)
Partition Coefficient	Koc		(L/kg)
FractionOrganicCarbon	foc		(-)

4. BIODEGRADATION

1st Order Decay Coeff*	lambda	6.9E-1	(per yr)
or		↑ or	
Solute Half-Life	t-half	1.00	(year)
or Instantaneous Reaction Model			
Delta Oxygen*	DO	5.8	(mg/L)
Delta Nitrate*	NO3	6.3	(mg/L)
Observed Ferrous Iron*	Fe2+	16.6	(mg/L)
Delta Sulfate*	SO4	24.6	(mg/L)
Observed Methane*	CH4	7.2	(mg/L)

5. GENERAL

Modeled Area Length*	450	(ft)
Modeled Area Width*	900	(ft)
Simulation Time*	44	(yr)



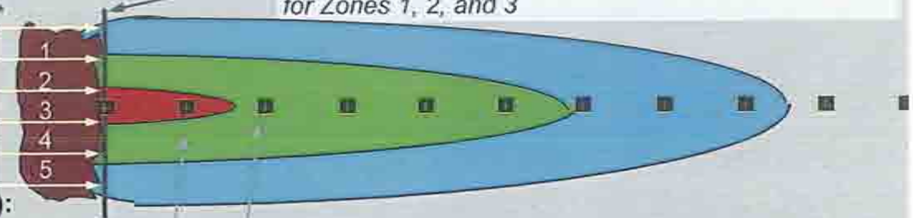
6. SOURCE DATA

Source Thickness in Sat.Zone* 20 (ft)

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3

Source Zones:

Width* (ft)	Conc. (mg/L)*
180	
180	
180	0.02
180	0
180	0



View of Plume Looking Down

Source Halflife (see Help):

Infinite	Infinite	(yr)
Inst. React. ↑	↑ 1st Order	
Soluble Mass	Infinite	(Kg)
In Source NAPL, Soil		

Observed Centerline Concentrations at Monitoring Wells
If No Data Leave Blank or Enter "0"

7. FIELD DATA FOR COMPARISON

Concentration (mg/L)								.001			
Dist. from Source (ft)	0	45	90	135	180	225	270	315	360	405	450

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN — **View Output**

RUN ARRAY — **View Output**

Help

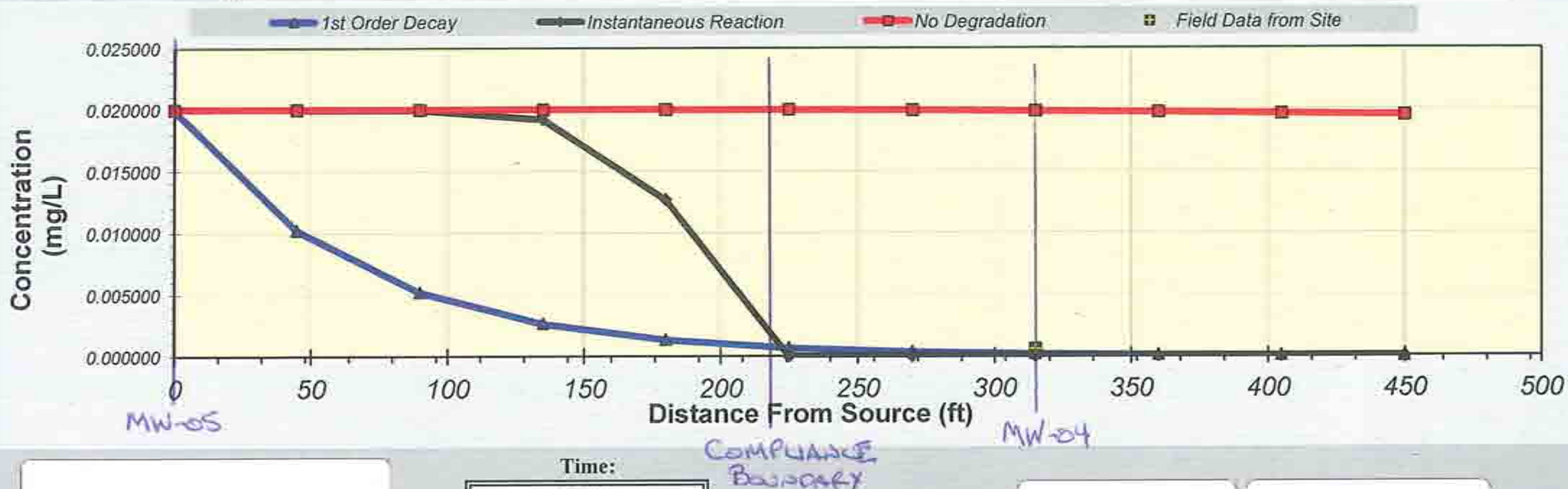
Recalculate

Paste Example Dataset

Restore Formulas for Vs,

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

	Distance from Source (ft)										
TYPE OF MODEL	0	45	90	135	180	225	270	315	360	405	450
No Degradation	0.020000	0.020000	0.020000	0.019999	0.019992	0.019969	0.019924	0.019852	0.019755	0.019636	0.019499
1st Order Decay	0.020000	0.010244	0.005247	0.002688	0.001376	0.000704	0.000360	0.000184	0.000094	0.000048	0.000024
Inst. Reaction	0.020000	0.020000	0.019990	0.019210	0.012725	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Field Data from Site								0.000590			



Calculate

Time: 44 Years

Return to

Recalculate This

APPENDIX E

Financial Assurance Documentation

JACKSON COUNTY FINANCE OFFICE

401 GRINDSTAFF COVE ROAD, SUITE A-241
SYLVA, NORTH CAROLINA 28779
828/ 586-4055 • FAX 828/ 586-7506

May 4, 2011

Mr. Donald Herndon
Solid Waste Section
DENR – Division of Waste Management
1646 Mail Service Center
Raleigh, NC 27699-1646

Dear Mr. Herndon,

I am the chief financial officer of Jackson County, North Carolina, 401 Grindstaff Cove Road, Suite A-207, Sylva, North Carolina 28779. This letter is in support of this unit of local government's use of the financial test to demonstrate financial assurance, as specified in 15A NCAC 13B .1628(e)(1)(F).

This unit of local government is the owner of the following facilities for which financial assurance for post-closure and corrective action is demonstrated through the financial test specified in 15A NCAC 13B .1628(e)(1)(F). The current post-closure and corrective action cost estimates covered by the test are shown for the following facility:

Jackson County Landfill
Old Dillsboro Road
Jackson County, North Carolina
Permit #50-02

Post-Closure Cost Estimate: $691,302.56
Corrective Action Cost Estimate: $804,692.74
Total Costs to be Assured: $1,495,995.30

The fiscal year of the unit of local government ends June 30. The figures for the following items marked with an asterisk are derived from this unit of local government's Annual Financial Information Report (AFIR) for the latest completed fiscal year, ended June 30, 2010.

RATIO INDICATORS OF FINANCIAL STRENGTH

1.	Sum of current closure, post-closure and corrective cost estimates	$1,495,995.30
*2.	Sum of cash and investments (AFIR Part 7)	$33,829,873
*3.	Total Expenditures (AFIR Part 4 Columns a & b and Part 5 for municipalities or Part 5 excluding educational capital outlays for counties)	$62,653,336
*4.	Annual debt service (AFIR Part 4 Section I)	$6,513,292

5.	Assured environmental costs to demonstrate financial responsibility in the following amounts under Division rules:	
	MSWLF under 15A NCAC 13B .1600	$1,495,995.30
	Hazardous waste treatment, storage and disposal Facilities under 15A NCAC 13A .0009 and .0010	$0
	Petroleum underground storage tanks under 15A NCAC 2N .0100-.0800	$0
	Underground Injection Control System facilities under 15A NCAC 2D .0400 and 15A NCAC 2C .0200	$0
	PCB commercial storage facilities under 15A NCAC 20 .0100 and 15A NCAC 2N .0100	$0
	Total assured environmental costs	$1,495,995.30
*6.	Total Annual Revenue (AFIR Part 2)	$68,261,669
7.	Is line 5 divided by line 6 less than or equal to 0.43?	yes
8.	Is line 2 divided by line 3 greater than or equal to 0.05?	yes
9.	Is line 4 divided by line 3 less than or equal to 0.20?	yes

Sincerely,

Darlene Fox
Jackson County Finance Director
401 Grindstaff Road
Sylva, NC 28779

Table 1
Annual Post Closure Care Cost
Dillsboro Landfill
Jackson County, North Carolina
May 2, 2011

Task	Professional Costs						Subcontractor Costs				Comments/Assumptions	Cost
	C. Pro	Pro III	Pro II	Pro I	Tech	Expenses	Lump Sum	Quantity	Unit	Cost/Unit		
	116	90	81	73	60							
Task 1 - Semiannual Groundwater Sampling												
Preparations			4.00		4.00							
Travel			4.00		3.00							
Billable Equipment						2,204.00					Includes Mileage	
Collect Water Samples			32.00		24.00							
Analyze Samples							10,382.00				Laboratory	
Waste Disposal												
Write semiannual report	20.00	7.00	28.00	12.00								
Professional Hours	20.00	7.00	68.00	12.00	31.00	NA					Subtotal - Subcontractor Costs	$ 10,382.00
Professional Costs	2,320.00	630.00	5,508.00	876.00	1,860.00	2,204.00					Subtotal - Markup on Subcontractors	$ 1,038.20
Professional Admin Fee	232.00	63.00	550.80	87.60	186.00	NA					Subtotal - Subcontractor Costs with Markup	$ 11,420.20
Professional Costs with Admin Fee	2,552.00	693.00	6,058.80	963.60	2,046.00	2,204.00					Subtotal - Professional Costs with Admin Fee	$ 14,517.40
											Subtotal - Task 1	$ 25,937.60
Task 2 - Landfill Gas Monitoring												
Preparations					0.50							
Travel					2.00							
Billable Equipment						70.00					Includes Mileage	
Rental Equipment							440.00					$ -
Record Field Measurements					6.00							$ -
Report Field Measurements	0.50	2.00			5.00							$ -
												$ -
Professional Hours	0.50	2.00			13.50	NA					Subtotal - Subcontractor Costs	$ 440.00
Professional Costs	58.00	180.00			810.00	70.00					Subtotal - Markup on Subcontractors	$ 44.00
Professional Admin Fee	5.80	18.00			81.00	NA					Subtotal - Subcontractor Costs with Markup	$ 484.00
Professional Costs with Admin Fee	63.80	198.00			891.00	70.00					Subtotal - Professional Costs with Admin Fee	$ 1,222.80
											Subtotal - Task 2	$ 1,706.80
											Total Annual Cost	$ 27,644.40

Table 2
Corrective Action Implementaion Cost
Dillsboro Landfill
Jackson County, North Carolina
May 2, 2011

Leachate Extraction in Combination with Monitored Natural Attenuation

Task	Professional Costs					Subcontractor Costs				Comments/Assumptions	Cost
	C. Pro	Pro III	Tech	Clerical	Expenses	Lump Sum	Quantity	Unit	Cost/Unit		
	116	90	60	38							
Task 1 - Plans, Permits, and Bid Documents											
Future Sampling and Analysis Plan	0.50	2.00	8.00								
Health and Safety Plan	0.25	1.00	4.00								
Initial Application to the DENR/TWSA	10.00	40.00		6.00							
Response to Questions from DENR/TWSA	5.00	20.00		2.00							
Bid Documents	10.00	30.00		4.00							
Professional Hours	25.75	93.00	12.00	12.00	NA					Subtotal - Subcontractor Costs	$ -
Professional Costs	2,987.00	8,370.00	720.00	456.00	0.00					Subtotal - Markup on Subcontractors	$ -
Professional Admin Fee	298.70	837.00	72.00	45.60	NA					Subtotal - Subcontractor Costs with Markup	$ -
Professional Costs with Admin Fee	3,285.70	9,207.00	792.00	501.60	0.00					Subtotal - Professional Costs with Admin Fee	$ 13,786.30
Task 2 - Extraction System Installation										Subtotal Task 1	$ 13,786.30
Oversight			80.00								
Mileage					550.00						
LFG Extraction Well Head Modification							9.00	wells	500.00		$ 4,500.00
Well Caps							9.00	wells	1,338.00		$ 12,042.00
Short AP3 Bottom Load Pumps							3.00	pumps	1,665.00		$ 4,995.00
AP3 Fittings							3.00	wells	25.00		$ 75.00
Conversion Kit for Existing Pump							1.00	pump	50.00	Convert Timm's existing AP4 pump	$ 50.00
Short AP4 Bottom Load Pumps							5.00	pumps	2,315.00		$ 11,575.00
AP4 Fittings							6.00	wells	125.00		$ 750.00
Nylon Tubing Bundle							630.00	feet	6.65	70 feet of tubing per well	$ 4,189.50
Support Rope							630.00	feet	0.45		$ 283.50
Pump Cycle Counters							9.00	wells	220.00		$ 1,980.00
Mobilization						1,000.00					$ 1,000.00
Trenching on Landfill							1,500.00	feet	9.00	Trench from wellheads to old scale foundation	$ 13,500.00
2" SDR 9 HDPE with Yellow Stripe							1,500.00	feet	3.00	Line for conveying compressed air to wells	$ 4,500.00
2" SDR 11 HDPE							1,500.00	feet	2.00	Line for conveying leachate from wells	$ 3,000.00
Air Compressor with Dryer						20,000.00					$ 20,000.00
Electrical Subcontractor						1,000.00				Connect Air Compressor	$ 1,000.00
Professional Hours	0.00	0.00	80.00	0.00	NA					Subtotal - Subcontractor Costs	$ 83,440.00
Professional Costs	0.00	0.00	4,800.00	0.00	550.00					Subtotal - Markup on Subcontractors	$ 8,344.00
Professional Admin Fee	0.00	0.00	480.00	0.00	NA					Subtotal - Subcontractor Costs with Markup	$ 91,784.00
Professional Costs with Admin Fee	0.00	0.00	5,280.00	0.00	550.00					Subtotal - Professional Costs with Admin Fee	$ 5,830.00
Task 3 - Connection to TWSA										Subtotal Task 2	$ 97,614.00
Oversight			40.00								
Mileage					275.00						
Mobilization						300.00					$ 300.00
Wet Well and Installation						8,000.00					$ 8,000.00
Suction Lift Pump						1,000.00					$ 1,000.00
Suction Lift Pump Vault and Installation						3,000.00					$ 3,000.00
Flow Meter						500.00					$ 500.00
Flow Meter Vault and Installation						500.00					$ 500.00
Force Main Trenching							650.00	feet	13.00	Park	$ 8,450.00
2-inch diameter Schedule 40 PVC							650.00	feet	9.00	Force Main Piping to Green Energy Park Sewer	$ 5,850.00
Electrical Subcontractor						500.00				Connect Pump and Float Switches	$ 500.00
Professional Hours	0.00	0.00	40.00	0.00	NA					Subtotal - Subcontractor Costs	$ 28,100.00
Professional Costs	0.00	0.00	2,400.00	0.00	275.00					Subtotal - Markup on Subcontractors	$ 2,810.00
Professional Admin Fee	0.00	0.00	240.00	0.00	NA					Subtotal - Subcontractor Costs with Markup	$ 30,910.00
Professional Costs with Admin Fee	0.00	0.00	2,640.00	0.00	275.00					Subtotal - Professional Costs with Admin Fee	$ 2,915.00
										Subtotal Task 3	$ 33,825.00
										Total Capital Costs =	$ 145,225.30

Table 3
Annual Corrective Action System Cost
Dillsboro Landfill
Jackson County, North Carolina
May 2, 2011

Leachate Extraction in Combination with Monitored Natural Attenuation											
	Professional Costs					Subcontractor Costs					
Task	C. Pro	Pro III	Tech	Clerical	Expenses	Lump Sum	Quantity	Unit	Cost/Unit	Comments/Assumptions	Cost
	116	90	60	38							
Task 1 - Additional Semiannual Sampling Parameters											
Filling Bottles (professional hours)			3.50							1.75 additional hours per event; 2 events per year	
Alkalinity							14.00	each	12.00	7 samples per event; 2 events per year	$ 168.00
Chloride							14.00	each	32.00	7 samples per event; 2 events per year	$ 448.00
Ferrous Iron							14.00	each	15.00	7 samples per event; 2 events per year	$ 210.00
Hydrogen							14.00	each	15.00	7 samples per event; 2 events per year	$ 210.00
Manganese							14.00	each	15.00	7 samples per event; 2 events per year	$ 210.00
Methane, Ethane, Ethene							14.00	each	68.00	7 samples per event; 2 events per year	$ 952.00
Nitrate							14.00	each	36.00	7 samples per event; 2 events per year	$ 504.00
Sulfate							14.00	each	10.00	7 samples per event; 2 events per year	$ 140.00
Total Organic Carbon							14.00	each	20.00	7 samples per event; 2 events per year	$ 280.00
Professional Hours	0.00	0.00	3.50	0.00	NA					Subtotal - Subcontractor Costs	$ 3,122.00
Professional Costs	0.00	0.00	210.00	0.00	0.00					Subtotal - Markup on Subcontractors	$ 312.20
Professional Admin Fee	0.00	0.00	21.00	0.00	NA					Subtotal - Subcontractor Costs with Markup	$ 3,434.20
Professional Costs with Admin Fee	0.00	0.00	231.00	0.00	0.00					Subtotal - Professional Costs with Admin Fee	$ 231.00
										Subtotal - Task 1	$ 3,665.20
Task 2 - Extraction System Operation and Maintenance											
Monthly Compliance Sampling			48.00							4 hours per month	
Mileage					660.00						
Compliance Parameters							12.00	samples	200.00	1 sample per event; 12 events per year	$ 2,400.00
Electrical Costs							12.00	months	653.50	Based on $0.06 per kilowatt-hour	$ 7,841.95
Annual Discharge (Gallons per Year)							1,200,000.00	gallons	0.0041	gallons	$ 4,920.00
Annual Air Compressor Maintenance						2,000.00				warranty)	$ 2,000.00
Professional Hours	0.00	0.00	48.00	0.00	NA					Subtotal - Subcontractor Costs	$ 17,161.95
Professional Costs	0.00	0.00	2,880.00	0.00	660.00					Subtotal - Markup on Subcontractors	$ 1,716.20
Professional Admin Fee	0.00	0.00	288.00	0.00	NA					Subtotal - Subcontractor Costs with Markup	$ 18,878.15
Professional Costs with Admin Fee	0.00	0.00	3,168.00	0.00	660.00					Subtotal - Professional Costs with Admin Fee	$ 3,828.00
										Subtotal - Task 2	$ 22,706.15
										Total Annual Cost	$ 26,371.35

Table 4

Twenty-Two Year* Estimate of Post-Closure and Corrective Action Costs

Dillsboro Landfill

Jackson County, North Carolina

May 2, 2011

Task	Yearly Cost	22 Year Cost	22 Year Cost Including Inflation**
Post-Closure Activities	$27,644.40	$608,176.80	$691,302.56
Extraction System Installation	$145,225.30	$145,225.30	$145,225.30
Extraction System Maintenance	$26,371.35	$580,169.70	$659,467.44
	Total	$1,333,571.80	$1,495,995.30

* Based on Permit For Closure

** Assumes 1.2% Inflation